RQF LEVEL 3

CSAPD301

COMPUTER SYSTEM AND ARCHITECTURE

Computer Peripherals Deployment

TRAINEE'S MANUAL

October,2024

COMPUTER PERIPHERALS DEPLOYMENT

KOICA Korea International Cooperation Agency

TQUM TVET Quality Management Project

2024

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COORDINATION TEAM

RWAMASIRABO Aimable

MARIA Bernadette M. Ramos

MUTIJIMA Asher Emmanuel

Production Team

Authoring and Review

MUKANYANDWI Leoncie

HABARUREMA Jean Felix

Validation

MUKASHYAKA Olive
UWIRAGIYE Jean Paul
UWITONZE Edithe

Conception, Adaptation and Editorial works

HATEGEKIMANA Olivier

GANZA Jean Francois Regis

HARELIMANA Wilson

NZABIRINDA Aimable

DUKUZIMANA Therese

NIYONKURU Sylvestre

HABIMANA Emmanuel

Formatting, Graphics, Illustrations, and infographics

YEONWOO Choe
SUA Lim
SAEM Lee
SOYEON Kim
WONYEONG Jeong
NGENDAHAYO Henry Gabriel

Financial and Technical support

KOICA through TQUM Project

TABLE OF CONTENT

ACRONYMS

ADF: Automatic Document Feeder

CBT: Competency-Based Training

CBA: Competency-Based Assessment

CMMS: Computerized Maintenance Management System

CSA: Computer System and Architecture

DLP: Digital Light Processing

DMD: Digital Micro mirror Device

ESD: Electrostatic Discharge

FAT: File Allocation Table

HD: High Definition

HP: Hewlett-Packard

HQs: Headquarters

HTTP: Hypertext Transfer Protocol

IC: Indicative Content

KOICA: Korea International Cooperation Agency

LCD: Liquid Crystal Display

LED: Light-Emitting Diode

LO: Learning Outcome

NTFS: New Technology File System

OS: Operating System

POST: Power-On Self-Test

PPEs: Personal Protective Equipment

PS/2: Personal System/2

RJ45: Registered Jack-45

RTB: Rwanda TVET Board

SATA: Serial Advanced Technology Attachment

SDI: Serial Digital Interface

SPD: Surge Protective Devices

SPS: Sanitary and Phytosanitary

TQUM Project: TVET Quality Management Project

TVET: Technical and Vocational Education and Training

Wi-Fi: Wireless Fidelity

INTRODUCTION

This trainee's manual includes all the knowledge and skills required in Computer System and Architecture specifically for the module of **“Computer Peripherals Deployment".** Trainees enrolled in this module will engage in practical activities designed to develop and enhance their competencies. The development of this training manual followed the Competency-Based Training and Assessment (CBT/A) approach, offering ample practical opportunities that mirror real-life situations.

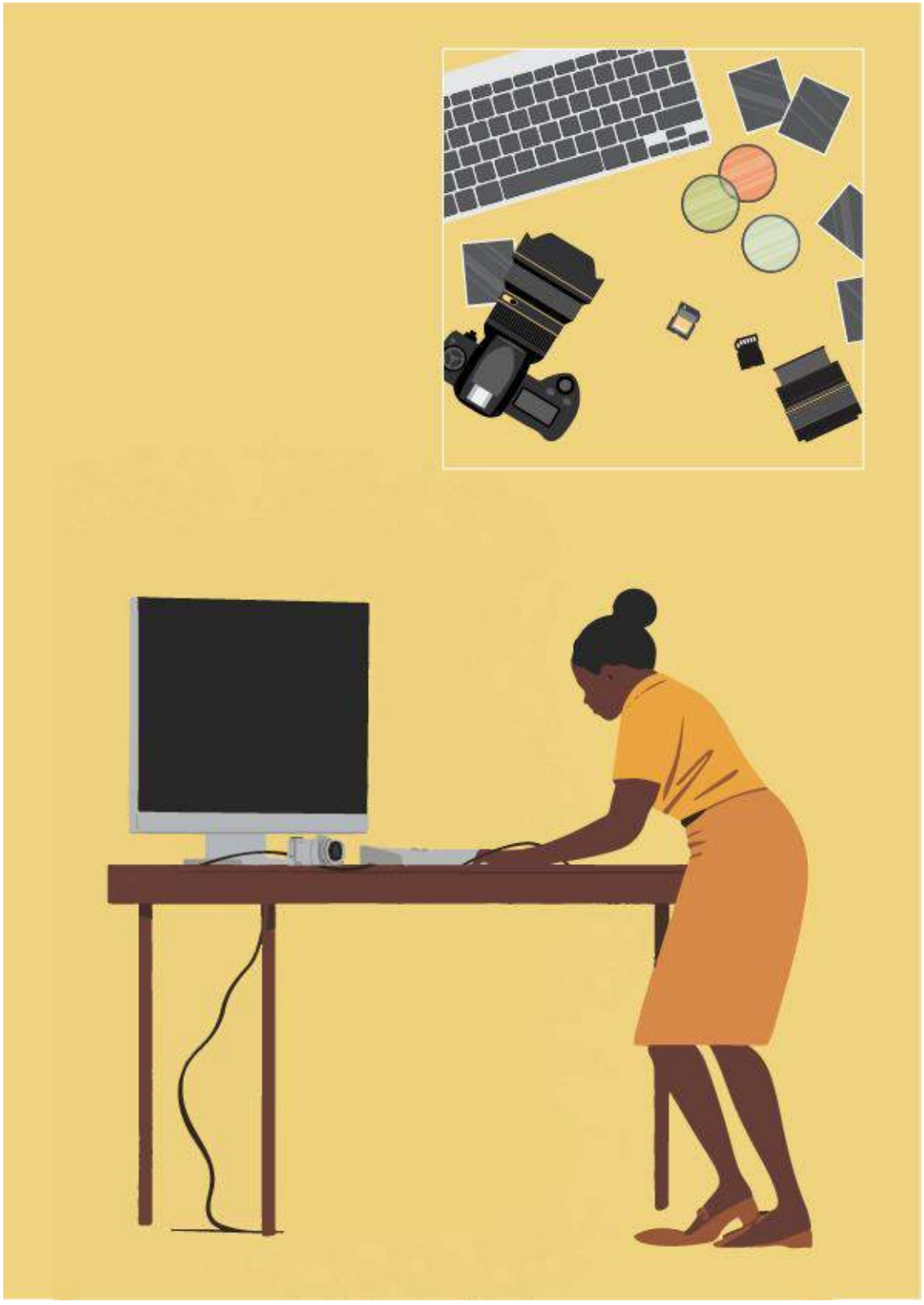
The trainee's manual is organized into Learning Outcomes, which is broken down into indicative content that includes both theoretical and practical activities. It provides detailed information on the key competencies required for each learning outcome, along with the objectives to be achieved.

As a trainee, you will start by addressing questions related to the activities, which are designed to foster critical thinking and guide you towards practical applications in the labor market. The manual also provides essential information, including learning hours, required materials, and key tasks to complete throughout the learning process.

All activities included in this training manual are designed to facilitate both individual and group work. After completing the activities, you will conduct a formative assessment, referred to as the end learning outcome assessment. Ensure that you thoroughly review the key readings and the 'Points to Remember' section.

MODULE CODE AND TITLE: CSAPD301 COMPUTER PERIPHERALS DEPLOYMENT

Learning Outcome 1: Connect computer peripherals
Learning Outcome 2: Configure computer peripherals
Learning Outcome 3: Maintain computer peripherals



Indicative contents

1.1 Description of the key concepts for computer peripherals

1.2 Identification of peripherals, connectors and ports

1.3 Connect peripherals devices

1.4 Installation of peripheral drivers

Key Competencies for Learning Outcome 1: Connect Computer Peripherals

Knowledge	Skills	Attitudes
• Description of key concepts for computer peripherals • Identification peripherals, connectors and ports	• Selecting peripherals devices • Connecting peripherals devices • Installing of peripheral drivers	• Having Self confidence in connect computer peripherals • Being Problem solver in connect computer peripherals • Having curiosity in connect computer peripherals • Having time management in connect computer peripherals • Being Accurate connect computer peripherals • Being Attentive connect computer peripherals

Duration: 10hrs

Learning outcome 1 objectives:

By the end of the learning outcome, the trainees will be able to:

1. Describe correctly the key concept of computer peripherals as used in computer system
2. Select appropriately computer peripherals according to their task to be done
3. Identify properly connectors and ports according to the peripherals to be connected
4. Connect effectively computer peripherals in line with their connectors
5. Install correctly peripherals drivers according to selected peripheral model and OS

Resources

Equipment	Tools	Materials
● Computer ● Printer ● Projector ● Scanner ● Webcam ● Whiteboard ● Digital camera	● Cable tester	● Cable ties ● Internet bundle ● Cables

Indicative content 1.1: Description of the key concepts for computer peripherals

Duration: 2 hrs

Theoretical Activity 1.1.1: Description of key concept of computer peripherals

Tasks:

1: You are request to answer the following questions for describing the key concept of computer peripherals

i. Define a term computer peripheral
ii. State the difference between connectors and ports
iii. Explain the following term Peripherals models
iv. What do you understand by Drivers?
v. Differentiate Troubleshoot and Diagnose

2: Provide the answer for the asked questions.

3: Present their findings/answers to the whole class

4: Ask the questions where are necessary and make clarification if any.

5: For more clarification, Read the key readings 1.1.1

Key readings 1.1.1.: Description of key concept of computer peripherals

- **Computer peripheral:**

A peripheral or peripheral device is an auxiliary device used to put information into and get information out of a computer.

Peripherals refer to all hardware components that are attached to a computer and are controlled by the computer system, but they are not the core components of the computer.

Some examples of computer peripherals are: Keyboard, mouse, scanners, tape drives, microphones, loudspeakers, webcams, digital cameras…

- **Connectors:**

It is the unique end of a plug, jack, or the edge of a card that connects to a port. All desktop computer expansion cards have a connector that allows them to connect in a slot on the motherboard while referring to cables; the connector is the end of the cable that connects into a computer port.

Figure 1: Example of connector

- **Ports:**

Computer ports are physical or virtual connection points that allow computers to communicate with external devices, peripherals, and networks. They serve as interfaces for data exchange between the computer and connected devices. It has either holes or a slot that matches the plug or card connected to the port and there are some ports that connecting the devices virtually(For example, port 80 is a network port that allows HTTP traffic on a network).

Figure 2 Example of computer virtual port

Figure 3 Example of computer physical port

- **Peripheral model:**

Several categories of peripheral devices may be identified, based on their relationship with the computer, a computer peripheral model refers to a specific make and type of an external device that connects to and works with a computer to add functionality. Peripheral models can vary widely based on:

- ✓ **Manufacturer**: Different brands (Logitech, HP, Canon) offer peripherals with varying features and quality.

- ✓ **Type and Purpose**: For example, a gaming mouse model will differ significantly from a standard office mouse model in terms of features like DPI settings, programmable buttons, and RGB lighting.
- ✓ **Connectivity: Peripherals** can connect via USB, Bluetooth, Wi-Fi, or other proprietary connections.
- ✓ **Compatibility**: Models are often designed with specific operating systems or hardware configurations in mind.
- ✓ **Specifications and Features**: These include resolution for printers or monitors, speed for external drives, and other functionality specific to the peripheral type.

- **Drivers:**

  This is a group of files that enable one or more hardware devices to communicate with the computer's operating system.

  Without the appropriate drivers, peripherals like printers, monitors, keyboards, and mice would not function correctly or at all, as the OS wouldn't know how to interpret the signals from these devices or send the correct commands to them.

  Proper installation and regular updating of these drivers ensure that peripherals function correctly, efficiently, and securely.

- **Troubleshooting**:

  It is the process of identifying, planning and resolving a problem, error or fault within a software or computer system.

  When issues arise, whether they are hardware-related, software-related, or due to configuration errors, troubleshooting helps identify the root cause and implement a solution to restore normal functionality while diagnostics is a method of testing a computer hardware device or software program to ensure it is working, as it should be.

  Diagnostic tools and procedures are used to detect issues, assess the health and performance of components, and provide detailed information that can help in troubleshooting and repairing any problems.

The following table differentiates **diagnose** and **troubleshoot**:

Aspect	Diagnose	Troubleshoot
Definition	Identifying the root cause of a problem	Fixing the problem based on the diagnosis
Purpose	Understand what is causing the issue	Resolve or correct the issue

Focus	Problem analysis and identification	Solution implementation and testing
Process	Gathering information, observing symptoms, analyzing	Applying corrective actions, step-by-step solutions

Points to Remember

- **Computer peripheral:** A peripheral or peripheral device is an auxiliary device used to put information into and get information out of a computer.
- **Connectors:** It is the unique end of a plug, jack, or the edge of a card that connects to a port while **ports** have either holes or a slot that matches the plug or card connected to the port.
- **Peripheral model**: Several categories of peripheral devices may be identified, based on their relationship with the computer
- **Drivers:** is a group of files that enable one or more hardware devices to communicate with the computer's operating system.
- **Troubleshooting**: It is the process of identifying, planning and resolving a problem, error or fault within a software or computer system while **Diagnostics** is a method of testing a computer hardware device or software program to ensure it is working as it should be.

Application of learning 1.1

COMPA School want to equip their computer lab with different computer peripherals and decide to purchase printers for the school. As computer system assembly technician you are asked to help this school to choose a peripheral model (Printer) that will supports network printing, scanning, and copying, which are useful in a school setting.

Indicative content 1.2: Identification of peripherals, connectors and ports

Duration: 2 hrs

Theoretical Activity 1.2.1: Identification of peripherals, connector and ports

Tasks:

1: You are asked to answer the following questions:

i. Describe the types of computer peripherals
ii. Explain the types of connectors
iii. State the types of ports
iv. Explain the types of drivers

2: Provide the answers of the asked questions and write them on papers

3: Present the findings to the whole class

4: Ask the questions for clarification where necessary.

5: For more clarification, read the key readings 1.2.1

Key readings 1.2.1.: Identification of peripherals, connector and ports

- **Types of peripherals**

  - ✓ **Input peripherals:**
    These are piece of computer hardware equipment) used to provide data and control signals to an information processing system such as a computer or other information appliance.
    Examples: Keyboard, mouse, touchscreen, Barcode reader, scanner, Microphone, Webcam, Game controller, Light pen, Digital camera
  - ✓ **Output peripherals:**
    This is any piece of computer hardware equipment used to communicate the results of data processing carried out by an information processing system (such as a computer) which converts the electronically generated information into human-readable form.
    Examples: Display, printer, projector, speaker, headphone
  - ✓ **Storage peripherals:**
    These refer to the devices used to store information for use in a computer
    Examples: Floppy Disk drive, Flash Disk, Disk drive, CD/DVD, Blue Ray

- Types of connectors

  - ✓ **USB (Universal Serial Bus)**
    USB is one of the most widely used connectors for connecting peripherals like keyboards, mice, printers, external hard drives, and more.

- ✓ **HDMI (High-Definition Multimedia Interface):**

  HDMI is used to transmit high-definition video and audio from a computer to a monitor, TV, or projector.

- ✓ **Ethernet:**

  Ethernet connectors are used for wired network connections, allowing computers to connect to local networks or the internet.

- ✓ **VGA (Video Graphics Array):**

  VGA is an older type of connector used to transmit analogue video signals from a computer to a monitor.

- ✓ **SATA:**

  SATA  is an external interface for SATA

  connections, typically used for connecting external hard drives.

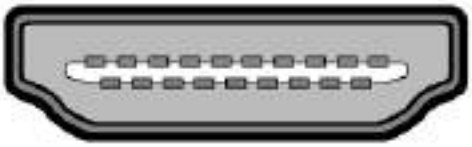
- ✓ **DVI Port (Digital Visual Interface):** Transmits digital video signals to a monitor, offering better quality than VGA.

- ✓ **Audio Jacks:** Used for audio input and output, typically for connecting headphones, microphones, and speakers.

- **Types of ports**
  - ✓ **USB Port (Universal Serial Bus):** Used for connecting a wide range of peripherals such as keyboards, mice, printers, external hard drives, and more.

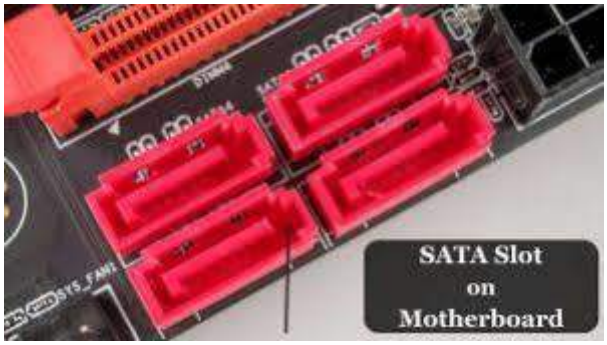
- ✓ **Ethernet Port**: Used for wired network connections to connect a computer to a local network or the internet.

- ✓ **HDMI Port (High-Definition Multimedia Interface):** Transmits high-definition video and audio from a computer to a monitor, TV, or projector.

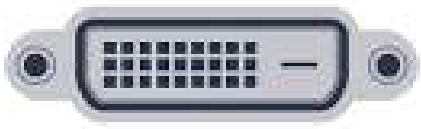


- ✓ **VGA Port (Video Graphics Array):** Transmits analogue video signals from a computer to a monitor.

- ✓ **SATA Port (Serial ATA):** Used internally to connect storage devices like hard drives and SSDs to the motherboard.



- ✓ **DVI (Digital Visual Interface):**
  DVI is used to transmit digital video signals to a monitor, and it's a step up from VGA in terms of quality.



- ✓ **Audio Jacks:** These connectors are used for analogue audio input and output, typically for headphones, microphones, and speakers.

- **Types of drivers**
  - ✓ **Kernel Mode Drivers:**
    These drivers operate in the kernel mode of the operating system, meaning they have high-level access to system resources. They can directly interact with the hardware and are essential for the basic functioning of the computer.
  - ✓ **User Mode Drivers:**
    These drivers operate in the user mode, meaning they have limited access to system resources and run as separate processes from the kernel. They are safer to operate because errors in user mode drivers are less likely to crash the entire system
  - ✓ **Virtual Device Drivers:**
    These drivers create a virtual representation of hardware, allowing software to interact with devices that do not physically exist. They are often used in virtual machines or for emulating hardware in software.
  - ✓ **Network Drivers:**
    These drivers manage network interfaces and allow the computer to communicate with other devices over a network. They are crucial for internet access and networked services.
  - ✓ **File System Drivers:**
    These drivers manage the file system, allowing the operating system to read, write, and manage files on storage devices. They translate the file system's commands into hardware actions.
  - ✓ **Plug and Play Drivers:**
    These drivers are designed to automatically detect and configure hardware devices when they are connected to the computer. They simplify the process of adding new hardware.

Points to Remember

- **Types of peripherals**
    - ✓ **Input peripherals:** It is used to entering data in the computer
    - ✓ **Output peripherals:** It is used to communicate the results of data processing carried out by an information processing system
    - ✓ **Storage peripherals:** refers to the devices used to store information for use in a computer
- **Types of connectors**
    - ✓ USB (Universal Serial Bus)
    - ✓ HDMI (High-Definition Multimedia Interface)
    - ✓ Ethernet
    - ✓ VGA (Video Graphics Array):
    - ✓ SATA
    - ✓ SDI
- **Types of ports**
    - ✓ USB Port (Universal Serial Bus)
    - ✓ Ethernet Port
    - ✓ HDMI Port (High-Definition Multimedia Interface)
    - ✓ VGA Port (Video Graphics Array)
    - ✓ SATA Port (Serial ATA)
- **Types of drivers**
    - ✓ Kernel Mode Drivers
    - ✓ User Mode Drivers
    - ✓ Virtual Device Drivers

Application of learning 1.2

TD Printing Company has recently purchased a new laptop and is experiencing issues of connecting their printer and external hard drive to the new laptop. The operator is not sure of which ports to use, which connector to use, and which driver to be installed, to enable connection of peripherals to the laptop. As computer system assembly technician you are asked to support the operator and provide technical guidance so that he/she can print using the new laptop.

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Indicative content 1.3: Connect peripherals devices

Duration: 3 hrs

Practical Activity 1.3.1: Selection of computer Peripherals devices

Tasks:

1: With referring to key readings 1.3.1, You are asked to do the following task:

BZ Technical Secondary School needs to equip their computer lab with different peripherals, which will allow lab users to print and copy their documents, to hear sounds from projected videos, and to be connected to the internet. As computer system assembly technician, BZ TSS hired you to select the computer peripherals which will be used in this computer lab according to its hardware requirements and intended to use.

2: Select the computer peripherals to be equipped a computer lab.

3: Present your work to the trainer or workshop instructor

4: Ask for clarification if any.

Key readings 1.3.1: Selection of computer Peripherals devices

To equip the computer lab of BZ Technical Secondary School, you need to carefully select computer peripherals(print and copy their documents, to hear sounds from projected videos, and to be connected to the internet) that meet with the hardware requirements and intended to use in practical activities :

- **Monitors:**
  - ✓ **Type:** Full HD or 4K monitors with IPS panels for accurate color reproduction and wide viewing angles, important for multimedia tasks.
  - ✓ **Size**: 24 to 27 inches to provide ample screen space for multitasking and detailed work.

- **Keyboards**: Ergonomic keyboards with a full set of keys, including function and numeric keys, are suitable for typing and programming tasks.

- **Mice:** Optical mice with adjustable DPI settings to cater to different tasks; consider wireless options to reduce cable clutter.

- **Printers**: High-resolution color printers (preferably laser for durability and speed) for printing designs, project work, and other materials.

- **Scanners:** High-quality scanners for digitizing documents and artwork, useful in multimedia projects.

- **Speakers** : Decent quality speakers for multimedia content playback during lessons

- **Headsets**: Noise-cancelling headsets with built-in microphones for multimedia editing, online learning, and virtual meetings.

- **External Storage Devices**: For backing up large multimedia files and sharing resources among students and to facilitate easy transfer of work between computers.

- **Projectors or Smartboards**: For teaching and presentations, consider a high-resolution projector or smartboard to display content to the entire class and For large classroom environments, invest in HDMI-compatible projectors with at least 1080p resolution. Ensure they are compatible with the computers or multimedia devices in the school.

- **Networking Equipment**: Router, Adapters or Ethernet Switches which are Reliable networking solutions to ensure all computers can access the internet and share resources seamlessly and Ensure printers or scanners have Ethernet or Wi-Fi capability to allow multiple computers to access the printer on a shared network.

Practical Activity 1.3.2: Connecting computer peripheral devices

Task:

1: With reference to the key readings 1.3.2, you are asked to perform the following task:

Referring to the selected peripheral devices, you are asked to connect those peripherals to the computer in your school computer lab.

2: Connect the selected peripherals to a computer

3: Present your work done to the trainer or workshop assistant

4: Ask for clarification or assistance if any

Key readings 1.3.2: Connecting Computer peripheral devices

The way used for connecting the peripheral devices depending on the type of peripheral, the connector it uses, and the available ports on your computer:

- **Identify the Peripheral Type**:
  Determine the type of device you want to connect. Peripherals can be input devices (like keyboards, mice, scanners), output devices (like printers, monitors, speakers), or storage devices (like external hard drives).
  Examples**:** Mouse, keyboard, printer, monitor, external hard drive.
- **Determine the Connection Method:**
  Check the connection type supported by both your computer and the peripheral. Peripherals typically use wired or wireless connections.

  ✓ **Common Wired Connections**:
  - USB**:** Universal Serial Bus, common for most peripherals.
  - HDMI/DisplayPort: Used for external monitors or projectors.
  - Ethernet**:** For networking devices, such as printers or shared storage.

  ✓ **Common Wireless Connections:**
  - Bluetooth**:** Often used for wireless keyboards, mice, and audio devices.
  - Wi-Fi**:** For devices like networked printers and scanners.

- **Interconnect Device and peripherals based Connection method**

  ✓ **Wired Connection:**

For USB or HDMI devices, plug the cable into the corresponding port on your computer.

- **USB:** Insert the USB connector into **a USB port.** This is common for peripherals like keyboards, mice, printers, or external drives**.**
- **HDMI/DisplayPort:** Plug the HDMI/DisplayPort cable into the monitor and the computer for video output.
- **Ethernet:** Connect an Ethernet cable to networked peripherals (e.g., a network printer) if they require a wired network connection.

✓ **Wireless Connection:** Enable wireless mode on the peripheral device and pair it with the computer.

- Bluetooth**:**

  - **Turn on Bluetooth**: Ensure Bluetooth is enabled on your computer.
  - **Pairing Mode:** Turn on the peripheral and place it in Bluetooth pairing mode.
  - **Select Device:** On your computer, go to Bluetooth settings and select the device from the list of available devices to pair.

- Wi-Fi**:**

  - **Connect Device to Wi-Fi:** Make sure the device (a wireless printer/scanner) is connected to the same Wi-Fi network as your computer.
  - **Device Discovery:** Use your computer's "Add Device" function to discover and connect to the peripheral over the network.

- **Install peripheral if necessary:** Drivers are essential software that enables your computer's operating system (OS) to communicate and work with a specific peripheral device. Here's why installing drivers is crucial: Drivers are essential software that enables your computer's operating system (OS) to communicate and work with a specific peripheral device.
  You don't always need to install drivers for each peripheral. Many modern peripherals, particularly those that use common interfaces like USB, are "plug-and-play." This means that your operating system (OS) likely has built-in drivers or can automatically download them from Windows Update, making them ready to use as soon as you connect them

- **Test the Peripheral:** Ensure the device is working properly. This can involve basic tests depending on the type of peripheral:

  ✓ **Input Devices:** Test by typing (keyboard) or moving the cursor (mouse).

- ✓ **Output Devices:** Check if the monitor displays correctly, the printer prints, or the speaker produces sound.
- ✓ Storage Devices: Check if the external hard drive or USB flash drive is detected and accessible on your computer.

- **Troubleshooting (If Necessary):** If the device doesn't work after connection, try these troubleshooting steps:

  - ✓ **Check Connections:** Ensure the cables are securely connected.
  - ✓ **Reinstall Drivers:** If the device isn't recognized, reinstall the drivers.
  - ✓ **Restart Devices:** Sometimes restarting both the peripheral and the computer can resolve connection issues.
  - ✓ **Update Drivers:** Check if newer drivers are available on the manufacturer's website and install them.

Points to Remember

The selection of computer Peripherals devices according to the hardware requirements considers:

- Monitors(Full HD or 4K, 24 to 27 inches)
- Keyboards: For general use in classrooms and labs, basic wired or wireless USB keyboards
- Mice: Optical mice that compatible for use
- Printers: Use a multi-function Printer because they offer printing, scanning, and copying functions. Look for network-capable models that can serve multiple classrooms.
- Speakers : Choose durable and cost-effective speakers for classrooms or computer labs
- Headsets: Headsets with built-in microphones are useful for language learning labs or video conferencing in online classes.
- External Storage Devices: For backups and storage of large files (projects, multimedia), choose USB 3.0 or USB-C external hard drives with capacities of 1TB or more.
- USB Flash Drives: Provide students and staff with flash drives for data transfer and storage. Opt for reliable brands with at least 32GB capacity.
  - Projectors or Smartboards: Use HDMI that is compatible with projectors with at least 1080p resolution and with the computers or multimedia devices in the school.

Connecting Computer peripheral devices

- Identify the Peripheral Type
- Determine the Connection Method

- Plug in the Device or Enable Wireless Connection
- Install Drivers if necessary
- Test the Peripheral

Application of learning 1.3

BCD Company needs to set up a video conferencing room, to be used for different meetings. As computer system assembly technician, you are hired to perform the following activities;

i. Elaborate al list of all needed peripherals, to set up a video conference room.
ii. Determine the suitable connection methods
iii. Connect the whole video conferencing system.
iv. Test the video conference system connectivity and functionality

Indicative content 1.4: Installation of peripheral drivers

Duration: 3 hrs

Practical Activity 1.4.1: Installation of drivers on computer system

Task:

1: With referring to the key readings 1.4.1, you asked to read the following task:
According to the connected peripheral devices, you are requested to install the necessary drivers for the multifunction printer to ensure it works correctly with the computers in your school administration.

2: Install the drivers on connected peripherals as per task

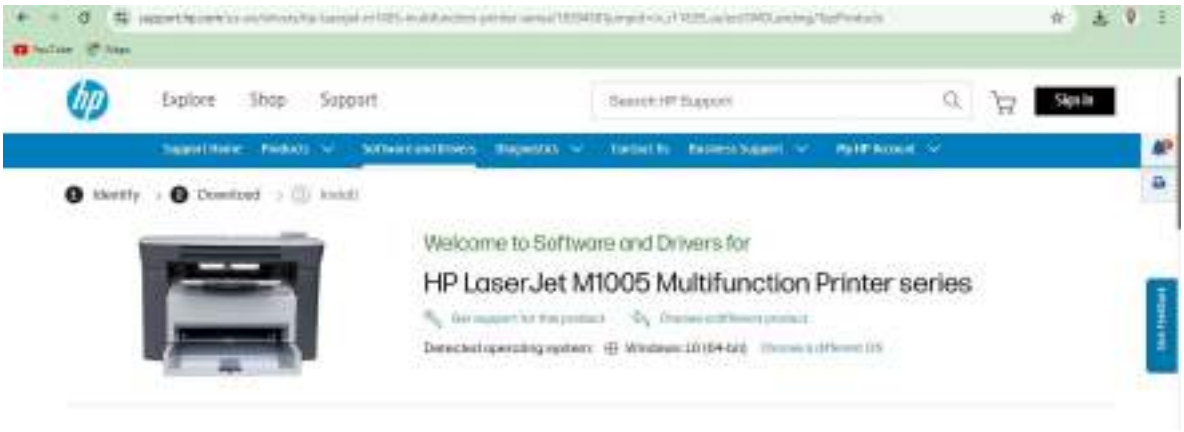
3: Present your work done to the trainer or colleague

5: Ask for clarification if any

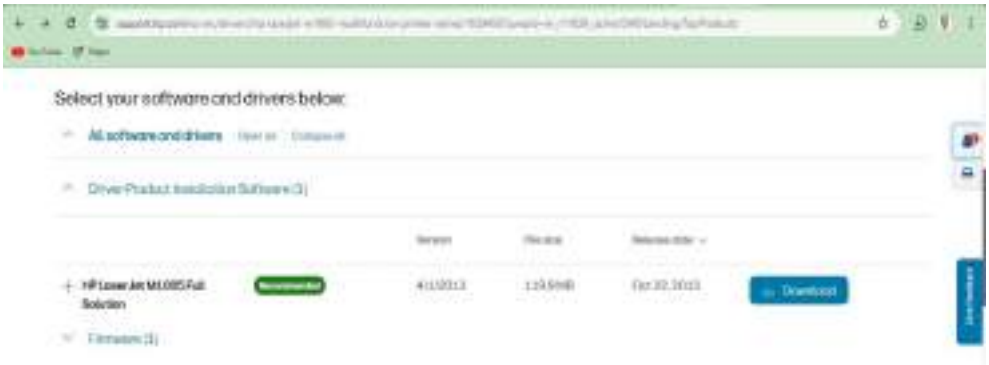
Key readings 1.4.1: Installation of Drivers on connected Peripherals

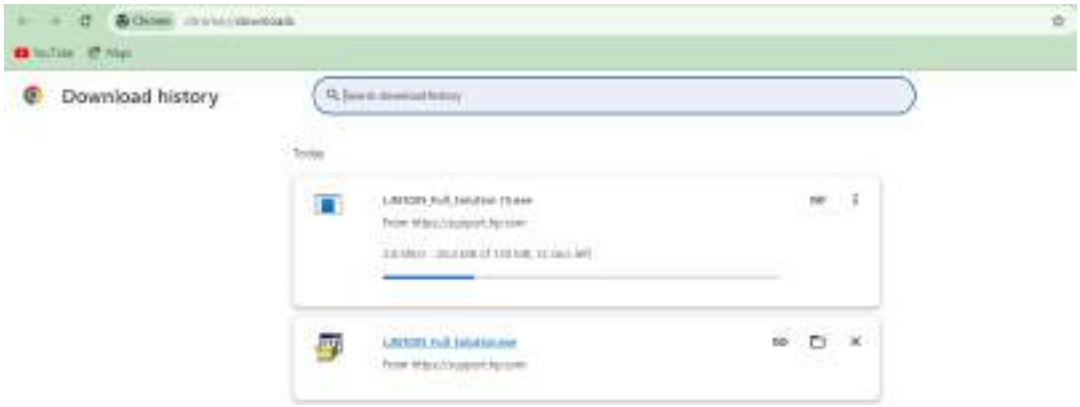
- Find(Obtain) the Correct peripheral(printer) Drivers
  - ✓ Visit the manufacturer's website and navigate to the support or downloads section.

  - ✓ Search for the specific driver package compatible with the printer model and the operating system (Windows or macOS) used on the school Administration's computers.



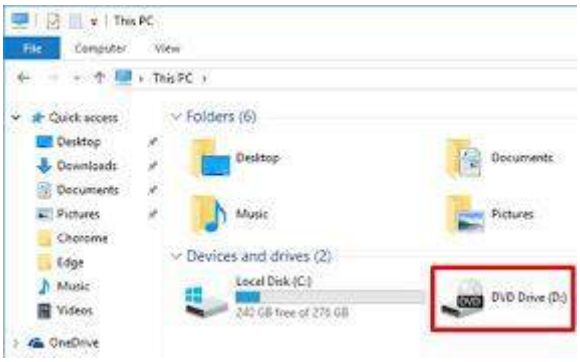
✓ Download the appropriate driver installer file(s).





- Install the Printer Drivers
  - ✓ If the printer came with an installation CD, insert it into the computer's CD/DVD drive

  - ✓ Follow the on-screen instructions to install the drivers directly from the CD.



- ✓ Follow the prompts on the screen to proceed with the installation.

- ✓ This usually involves agreeing to the license terms, selecting the installation location, and choosing the components to install.
- ✓ If the printer is already connected, the installation should detect it and proceed with installing the drivers.
- ✓ The installer may prompt you to configure settings like selecting a default printer, setting up a network connection (if the printer supports it), or enabling features like scanning and faxing.
- ✓ Once all settings are configured, complete the installation by clicking "Finish" or "Done."
- ✓ May prompt you to connect the printer at a certain point.

- Restart your computer
- Verify the Printer's Functionality(if working properly)

  - ✓ Go to the "Devices and Printers" section in the Control Panel or Settings.
  - ✓ Locate the newly installed printer, right-click on it, and select "Print a test page."
  - ✓ Ensure that the test page prints correctly, confirming that the printer is communicating with the computer.
  - ✓ Ensure there are no error messages or issues reported in the printer's status window (usually accessible from the printer software or in the Devices and Printers section).

- Troubleshooting (if necessary)

- ✓ If the printer does not function correctly, check for any existing drivers that might conflict with the new installation. Uninstall any old or conflicting drivers and reinstall the new ones.
- ✓ Ensure that the USB cable is securely connected and that the printer is powered on. Try using a different USB port or cable if necessary.

- Final Verification
  - ✓ Verifying again by reprinting a test page
  - ✓ Keep a record of the driver installation process and any issues encountered for future reference.
- Deploying the Drivers to Other Computers
  - ✓ If the school has multiple computers that need to use the multifunction printer, you can deploy the driver package to other computers or system

Points to Remember

Installation of Drivers on connected Peripherals (printer) steps

- Find (Obtain) the Correct peripheral(printer) Drivers
- Install the Printer Drivers
- Connect the printer to a computer (if not connected)
- Restart your computer
- Verify the Printer's Functionality (if working properly)
- Troubleshooting (if necessary)
- Final Verification
- Deploying the Drivers to Other Computers

Application of learning 1.4

The XYZ Company has recently acquired new equipment for their conference rooms and offices, including: A high-end multifunction scanner for the HR department and a new projector for the main conference room. They try to set up their selves but a scanner and projector not recognized by a computer, now the HR and the facilities coordinator have both requested your assistance as computer architecture technician in setting up these new peripherals with obtaining, installing, and verify the correct drivers for the scanner and projector in the XYZ Company's computing environment and working properly.

Learning outcome 1 end assessment

Written assessment

I. Choose the correct answer on the following questions

1. Which of the following is an example of an input peripheral?
   a) Monitor
   b) Printer
   c) Mouse
   d) Speaker
2. Which connector type is commonly used to connect printers to computers?
   a) VGA
   b) USB-B
   c) HDMI
   d) Ethernet
3. Which port is typically used to connect a monitor to a computer?
   a) HDMI
   b) USB-A
   c) RJ-45
   d) 3.5mm Audio Jack
4. Which of the following peripherals is primarily used for output?
   a) Keyboard
   b) Scanner
   c) Monitor
   d) Webcam
5. Which type of connector is used by most modern smartphones for charging and data transfer?
   a) USB-C
   b) HDMI
   c) VGA
   d) RJ-11
6. Which port would you use to connect a computer to a wired network?
   a) VGA
   b) USB-C
   c) RJ-45
   d) HDMI
7. Which type of peripheral typically uses a 3.5mm audio jack?
   a) Keyboard
   b) Headphones

c) External Hard Drive
d) Projector

8. What is the primary function of a USB hub?
   a) To connect multiple monitors to a single computer
   b) To increase data transfer speeds between devices
   c) To expand the number of USB ports available on a computer
   d) To connect a computer to a wireless network

9. Which of the following is an example of a peripheral that uses wireless technology to connect to a computer?
   a) External Hard Drive
   b) USB Flash Drive
   c) Wireless Mouse
   d) Ethernet Adapter

10. Which connector is most commonly used for high-definition video output?
   a) VGA
   b) USB-A
   c) HDMI
   d) FireWire

11. Which of the following is NOT considered a peripheral device?
   a) Keyboard
   b) Mouse
   c) Motherboard
   d) Printer

12. Which type of connector is most commonly used to connect a printer to a computer using internet?
   a) RJ45
   b) VGA
   c) HDMI
   d) Ethernet

13. Which port is used to connect a monitor to a computer for digital video output?
   a) VGA
   b) DVI
   c) PS/2
   d) Ethernet

14. What is the primary purpose of a device driver?
   a) To clean your hard drive
   b) To manage software updates
   c) To allow the operating system to communicate with hardware devices
   d) To protect the computer from viruses

15. When a peripheral device is not working, what should be your first troubleshooting step?
    a) Reinstall the operating system
    b) Check the device connection and power
    c) Install a new antivirus program
    d) Replace the device
16. Which of the following connectors is used for high-speed data transfer video and audio simultaneously
    a) VGA
    b) DVI
    c) HDMI
    d) FireWire
17. In which section of Windows can you check if a device driver is installed properly?
    a) Control Panel
    b) Device Manager
    c) Disk Management
    d) Task Manager
18. Which of these is the most common connector for hard disk?
    a) HDMI
    b) RJ-11
    c) SATA
    d) DisplayPort
19. What could be a reason for a peripheral device to stop working suddenly?
    a) Driver corruption or missing driver
    b) The device is physically damaged
    c) The device is unplugged
    d) All of the above
20. How can you install a missing driver for a new peripheral device?
    a) Open Device Manager and update the driver automatically
    b) Use Windows Update
    c) Download the driver from the manufacturer's website
    d) All of the above

II. Answer the question by True or false

a) A peripheral device driver is a type of software that allows the operating system to communicate with the hardware.
b) Troubleshooting a peripheral device typically involves checking the physical connections and reinstalling the device drivers if necessary
c) VGA and HDMI are examples of connectors used primarily for data storage devices.
d) An audio port and an Ethernet port serve the same function on a computer.
e) Diagnosing issues with a peripheral device may involve checking the device's compatibility with the computer's operating system.

f) All printers require the installation of a specific driver for them to function correctly with a computer.
g) Peripheral devices that use serial ports are becoming more common in modern computing environments.
h) Keyboard, mouse, and webcam are examples of output peripherals, while speakers and monitors are examples of input peripherals.
i) A joystick is an example of an input device
j) Virtual ports can be used as physical way of connecting computer peripherals
k) A driver is a software program that allows the computer to communicate with a peripheral.
l) A printer is a computer peripherals used for scanning documents
m) A port is a physical connection point on a computer where peripherals can be plugged in.
n) Troubleshooting involves on fixing problems with in a computer or its peripherals
o) A headphone jack is a type of port.
p) Diagnosing a computer problem involves identifying the root cause of the issue.

III. Define the term "peripheral device" and provide at least three examples of different types of peripheral devices.

IV. Explain the concept of "plug-and-play" and how it simplifies the process of connecting and using peripheral devices.

V. Compare and contrast the functions of USB and HDMI ports when connecting peripherals to a computer.

VI. When a computer peripheral isn't working properly, how would you determine whether the issue is related to the hardware, the drivers, or the operating system?

VII. How would you install a new printer driver on a computer if the device is not automatically recognized by the operating system?

Practical assessment

AMIZERO SHIPPING COMPANY (ASC) delivers shipping and clearing services for imported products. This company need to set up a new control room, that will help in monitoring shipped cargos until reached to their clients. This control room will have 10 computers, 2 multifunction printer, HD Projector, Webcam, Flatbed Image scanner, one speaker for every computer, 2 External Hard disk drive for back up, computer connected on trunked and terminated network in that room. You are hired as Computer System Assembly Technician to connect and setup those computer peripheral devices in that control room, so that they can be used in monitoring services.

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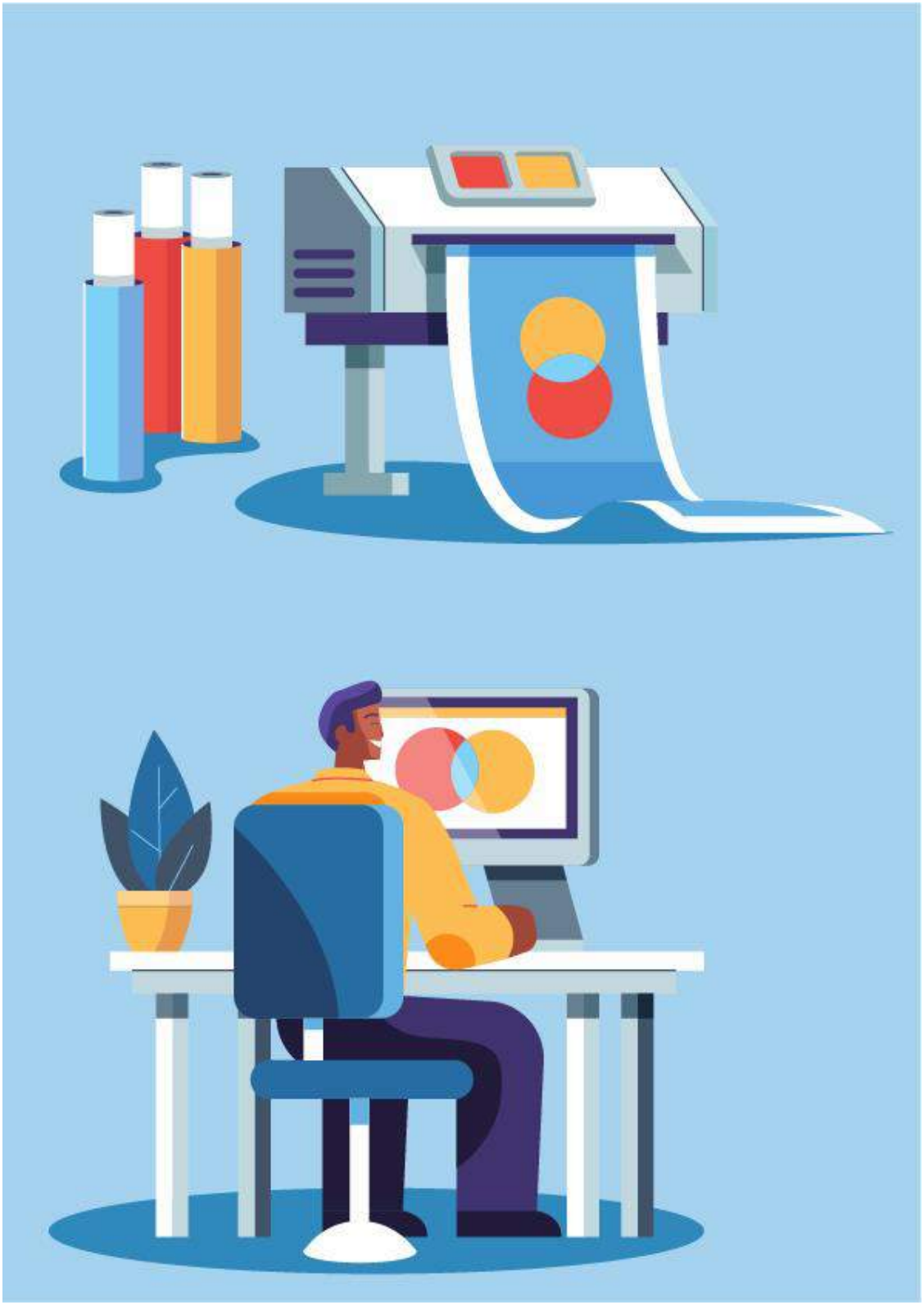


Indicative contents

2.1 Introduction to computer peripheral settings
2.2 Application of Security standards for networked peripherals
2.3 Perform peripheral functionality testing

Key Competencies For Learning Outcome 2: Configure Computer Peripherals

Knowledge	Skills	Attitudes
• Description to computer peripheral settings • Explanation of common security standards and protocols used in networked/connected peripheral devices. • Explanation the purpose and process of functionality testing for various peripherals	• Configuration of connected computer peripherals devices. • Customization of computer peripheral devices setting • Test and documentation on the functionality of computer peripherals devices	• Being attentive in configure computer peripherals • Having patience and persistence in configure computer peripherals • Having willingness in configure computer peripherals • Having commitment in configure computer peripherals • Being self-oriented in configure computer peripherals • Having analytical mindset in configure computer peripherals • Having proactiveness in configure computer peripherals

Duration: 30 hrs

Learning outcome 2 objectives:

By the end of the learning outcome, the trainees will be able to:

1. Describe correctly computer peripheral settings term according to its functionality
2. Customize appropriately computer peripheral settings based on the device functionality.
3. Configure properly the shared computer peripherals according to its functionality
4. Test Properly Peripherals device functionality according to configuration setting

Resources

Equipment	Tools	Materials
• Computer • Peripherals (Printer, scanner, projector, Router, keyboards, mice, monitors, external storage devices,..) • Cables connectors (USB, HDMI, VGA, Ethernet…)	• System software • Application software (antivirus programs,..) • Utilities software (Drivers) • Diagnostic tools (Device Manager, system utilities..)	• Internet bundles • Software license • Storage devices • Power extension • Network cables • Data cables • Installation CDs/DVDs or USB drives with device drivers. • Test scripts and checklists for conducting functionality tests.

Indicative content 2.1: Introduction to computer peripheral settings

Duration: 5 hrs

Theoretical Activity 2.1.1: Explanation of computer peripheral settings

Tasks:

1: You are asked to answer the following questions related to the explaining computer peripheral settings term:

i. What is a peripheral settings
ii. State the difference between customization and configuration

2: Provide the answer for the asked questions as their findings

3: Present the findings to the whole class

4: Ask the questions where are necessary and make clarification if any.

5: For more clarification, Read the key readings 2.1.1

Key readings 2.1.1.: Explanation of computer peripheral settings

- **Peripheral settings:**
  It refers to the configuration options and adjustments available for various peripheral devices connected to a computer. These settings allow users to control how peripherals like printers, monitors, keyboards, mice, external storage devices, and other connected hardware function and interact with the computer system.

Key Areas of Computer Peripheral Settings

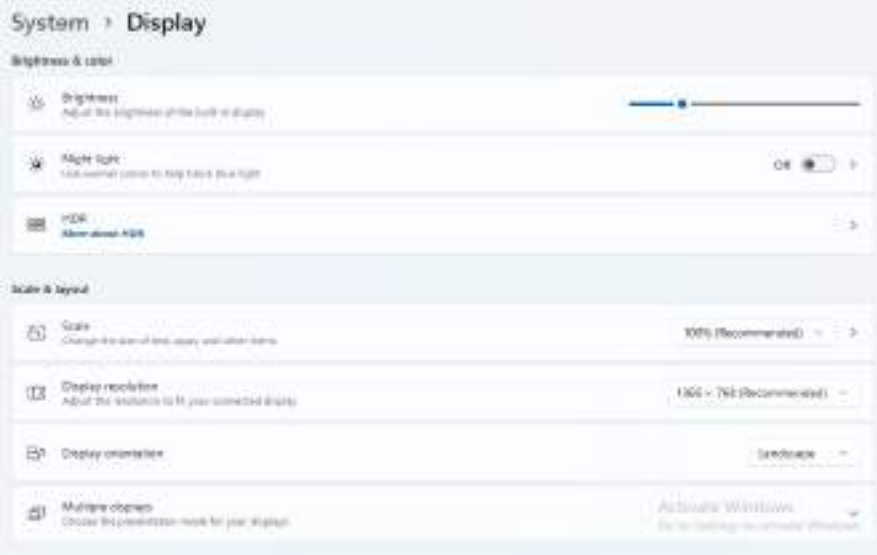
✓ **Monitor Settings**

- **Resolution:** Adjust the screen resolution to match the monitor's native setting for the best display quality (Full HD, 4K).

- **Color Calibration**: Calibrate colors for accurate color representation, which is crucial for graphic design and multimedia tasks.
- **Refresh Rate**: Set the refresh rate to the highest supported by the monitor (60Hz, 120Hz) for smoother visuals.

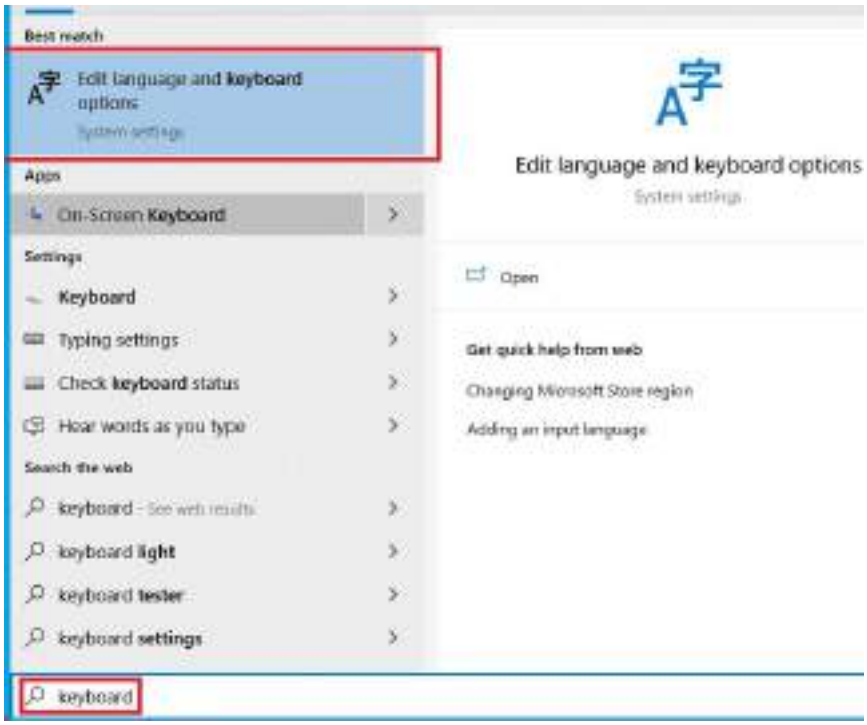
- **Display Arrangement:**

  For multi-monitor setups, configure the arrangement in the display settings to align with physical positioning.

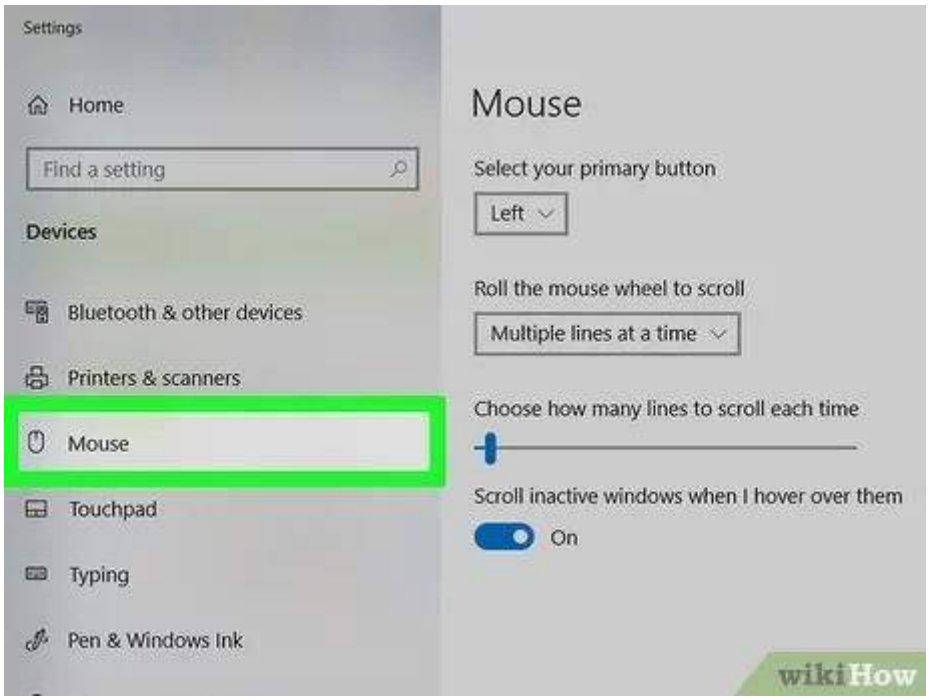


✓ **Keyboard and Mouse Settings**

- **Keyboard Layout:** Set the correct keyboard layout/types (QWERTY, AZERTY) based on user preference and language requirements.
- **Key Repeat Rate and Delay**: Adjust the repeat rate and delay settings for comfortable typing speed and response.

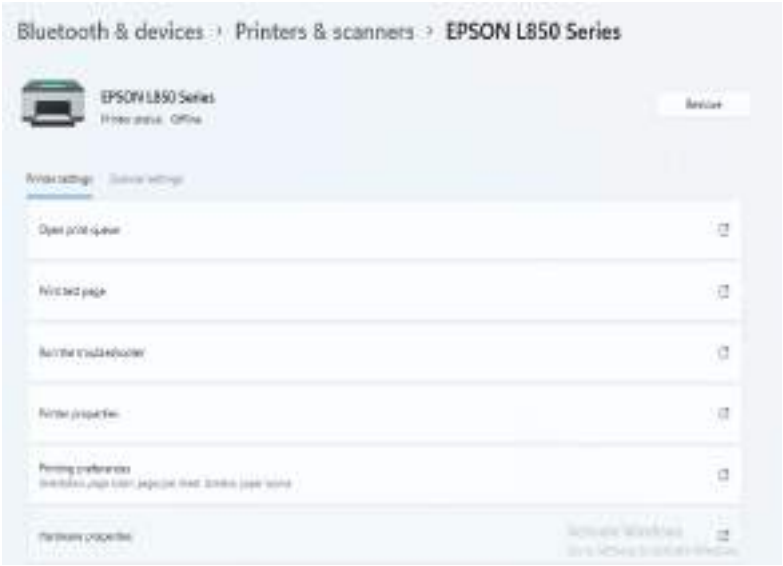


- **Mouse Sensitivity (DPI):** Adjust mouse sensitivity to match user preference, especially important for tasks like gaming or graphic design.

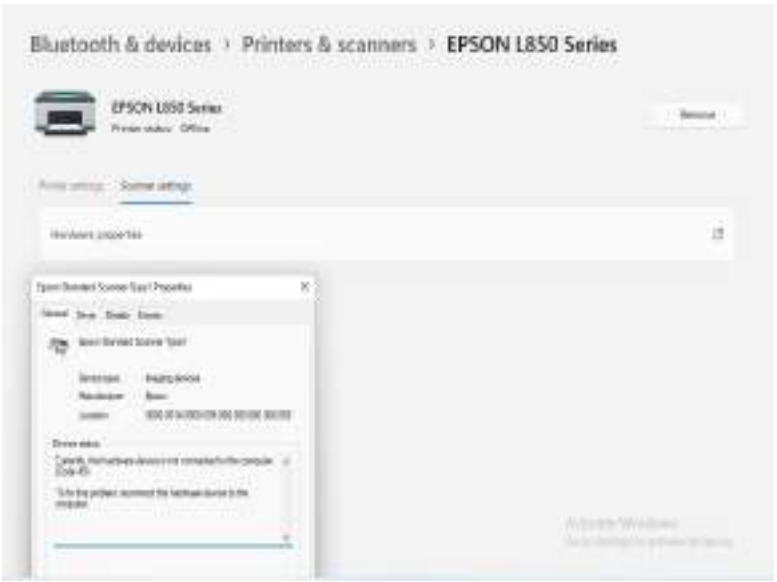


- **Pointer Speed and Acceleration:** Configure pointer speed and disable/enable acceleration as needed for precise control.

✓ Printer and Scanner Settings



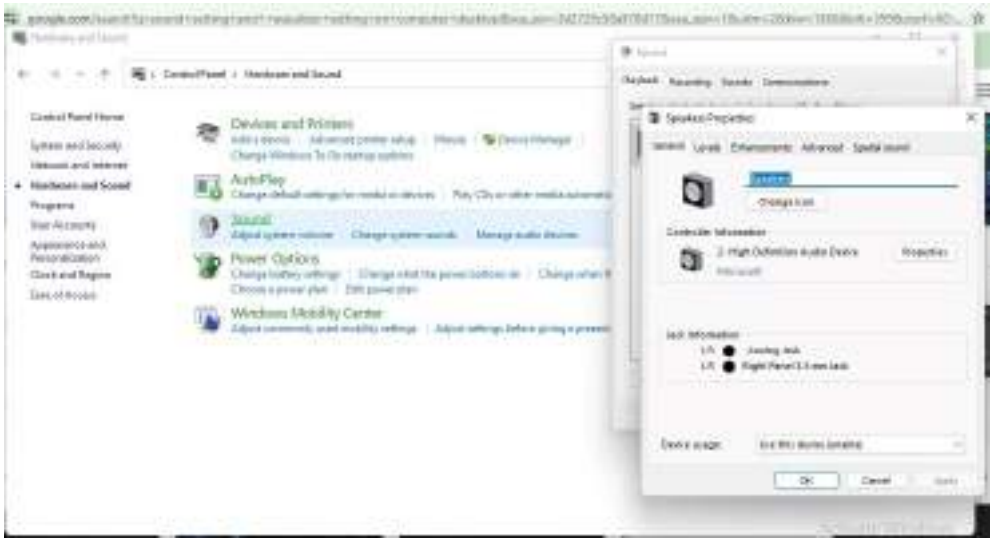
- **Default Printer**: Set the preferred printer as default, especially in environments with multiple printers.
- **Print Quality and Paper Size:** Configure default print quality (draft, standard, high) and paper size (A4, Letter) based on common tasks.
- **Scan Resolution (DPI):** Dots per inch (DPI) indicates the level of detail i n the scanned image and Higher DPI values (e.g., 300 DPI or 600 DPI) ar e suitable for high-quality prints, while lower values (e.g., 150 DPI) are a dequate for documents.



- **File Format**: PDF For documents, allows multi-page files, JPEG/JPG: For images, offers good quality with moderate file size and TIFF For high-qu ality images, often used in professional settings.

- **Scanning Mode**: Single-Sided: Scans one side of the document and Dou ble-Sided (Duplex): Scans both sides in one pass, saving time.

✓ **Audio Settings**



- **Default Playback Device:** Set the correct playback device (speakers, headphones) based on the setup.
- **Microphone Settings:** Adjust microphone volume, sensitivity, and noise cancellation features for clear audio capture.
- **Equalizer Settings**: Use equalizer settings to adjust sound output for specific audio needs (e.g., speech, music).

✓ **External Storage and Backup Devices**

- **Drive Letter** Assignment: Assign consistent drive letters to external drives for easy identification.
- **Power Settings:** Configure power settings for external drives (e.g., sleep mode) to prolong device lifespan.
- **Backup Schedule:** Set up automatic backup schedules for data protection and quick recovery.

✓ **Graphic Tablet Settings**

- **Pen Sensitivity:** Calibrate pen pressure sensitivity to match user drawing style.
- S**hortcut Keys:** Configure shortcut buttons on the tablet for quick access to commonly used functions in design software.

- **Customization**:

It refers to the process of adjusting and configuring a peripheral device's setting s to meet the specific needs, preferences, or requirements of the user or enviro nment.

This allows the user to tailor the behavior and functionality of the peripheral de vice to optimize their experience and enhance productivity.

Customization is a powerful way to make peripheral devices work exactly the wa y the user wants, enhancing both performance and satisfaction.

Aspects of Customization in Peripheral Device Settings are:

- ✓ Functionality Adjustments,
- ✓ Display and Audio Settings,
- ✓ Print and Scan Settings,
- ✓ User Profiles,
- ✓ Security Customization,
- ✓ Software Integration

Configuration refers to the process of setting up and arranging the settings and parameters of hardware or software components within a computer peripher al devices.

This process ensures that the components work properly and meet the specific n eeds or requirements of the user or environment.

Examples of computer peripheral configuration: Computer Setup, Network Configuration, Application Configuration, Peripheral Configuration.

Points to Remember

Computer peripheral settings Explanation

- **Peripheral settings:** It refers to the configuration options and adjustments avail able for various peripheral devices connected to a computer.
- **Customization:** It refers to the process of adjusting and configuring a peripheral device's settings to meet the specific needs, preferences, or requirements of th e user or environment while **configuration** refers to the process of setting up an d arranging the settings and parameters of hardware or software components within computer peripheral devices.

Application of learning 2.1

BVD company is delivers the service of call center through video and audio to the clients need service, this company bought new computer peripherals will use in voice over internet protocol (VoIP), As computer system assembly technician you are tasked to tell them which the sound settings will customize in order to balance comfort and clarity during calls.

Indicative content 2.2: Application of Security standards for networked peripherals

Duration: 15 hrs

Practical Activity 2.2.1: Configuration of security standards on computer peripherals

Task:

1: With referring to key readings 2.2.1, you are asked to perform the following task:

Your school has connected different computer peripherals in their computer lab. It needs to configure those computer peripherals and secure them against unauthorized access. As computer system assembly technician, you are asked to configure those peripherals and implementing basic security measures to protect these devices in accordance with standard security protocols.

2: Configure the computer peripheral devices connected in computer lab

3: Present your work to the trainer/workshop instructor/classmate

4: Ask for clarification if any.

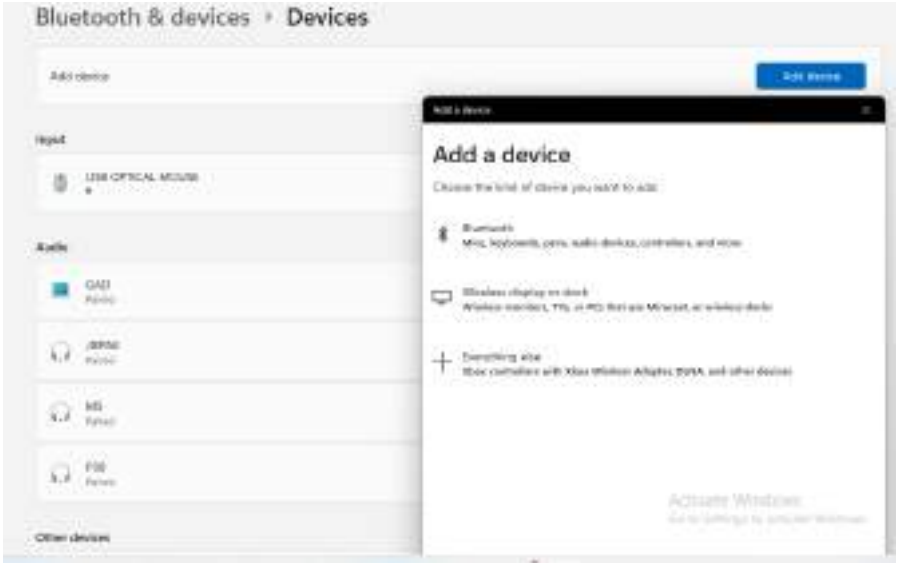
Key readings 2.2.1: Configuration of security standards on computer peripherals

- Identify the peripheral device: Determine the type of peripheral device you have (printer, scanner, webcam, external hard drive,) and Gather information about the device, such as the manufacturer, model, and any unique features or specifications
  - ✓ Keyboards: Identified by their layout, connectivity (wired or wireless), and additional features like backlighting.
  - ✓ Mice: Recognizable by their shape, button configuration, and connection type.
  - ✓ Monitors: Identified by screen size, resolution, and connection ports (HDMI, DisplayPort).
  - ✓ Printers: Known by their printing technology (laser, inkjet) and connection method (USB, Wi-Fi).
  - ✓ External Storage: Distinguished by capacity, connection type (USB, Thunderbolt), and physical design.

- **Connect the peripheral device**: Physically connect the peripheral to your

computer using the appropriate cable or wireless connection (USB, HDMI, Ethernet, Bluetooth, Wi-Fi) and Ensure the connection is secure and the device is properly powered on. **Connecting computer peripherals** involves linking external devices to a computer using various connection methods, such as cables or wireless technologies. Proper connection ensures that peripherals function correctly, efficiently, and securely. Understanding the different types of connections is crucial for setting up, troubleshooting, and optimizing computer systems in various environments.

- **Types of Connections for Computer Peripherals**
  - ✓ **Wired Connections:** Wired connections use physical cables to connect peripherals directly to a computer. These connections are generally more stable and secure than wireless options.
    - USB (Universal Serial Bus): Common Devices connected using USB are Keyboards, mice, printers, external hard drives, webcams, and game controllers
    - HDMI (High-Definition Multimedia Interface): Common Devices connected using HDMI are Monitors, projectors, TVs, and audio/video receivers.
    - VGA (Video Graphics Array): Older monitors and projectors
    - Ethernet (RJ45): Network printers, storage devices, and other network peripherals
    - Audio Jacks (3.5mm or 6.35mm: Speakers, headphones, microphones.
  - ✓ **Wireless Connections:** Wireless connections eliminate the need for physical cables, offering flexibility and reducing clutter. However, they may be susceptible to interference and require proper security settings.
    - Bluetooth: Wireless keyboards, mice, headphones, speakers, printers, and smartphones.



- Wi-Fi: Printers, scanners, external storage (NAS), and smart devices
- NFC (Near Field Communication): Mobile devices, payment systems, some wireless printers.

- **Best consideration for connecting computer Peripherals devices**
  - ✓ Choose the Right Cable or Connection Type: Use the latest standards (e.g., USB-C, HDMI 2.1) for the best performance and compatibility while For wireless devices, ensure they support current protocols like Bluetooth 5.0 or Wi-Fi 6 for enhanced speed and range.
  - ✓ Check Compatibility: Ensure that the peripheral and computer support the connection type. For instance, modern laptops may not have VGA ports and might require adapters.
  - ✓ Properly Install and Configure Drivers: Install the latest drivers and software for peripherals to ensure they work correctly and efficiently.
  - ✓ Secure Wireless Connections: For wireless peripherals, ensure connections are secure. Use encryption (e.g., WPA3 for Wi-Fi) and keep firmware updated to protect against security vulnerabilities.
  - ✓ Avoid Interference: Place wireless devices away from other electronics that may cause interference, like microwaves or cordless phones.
  - ✓ Test Connections: Regularly test connections to ensure peripherals are working correctly. Reboot devices or re-pair connections if issues arise.
  - ✓ Cable Management: Use cable organizers or clips to keep cables tidy and avoid tangling, especially in environments with multiple peripherals.
- **Install the necessary drivers:** Check the manufacturer's website to download the latest drivers for your specific peripheral device and operating system, If the drivers are not available online, you may need to use the installation media (CD, DVD, or USB drive) that came with the device and Follow the on-screen instructions to install the driver software.

- **Access the Device Settings:** Go to Settings **>** Devices or open Control Panel **>** Hardware and Sound **>** Devices and Printers, Select the connected device to access its settings.

Use of IP address in accessing the connected peripherals devices

✓ **IP (Internet Protocol)** is a set of rules that govern how data is sent and received over networks, including the internet. It is one of the core protocols that enable computers and other devices to communicate with each other.

An IP address is a unique numerical label assigned to each device connected to a network. It serves two main functions: identifying the host (or device) and providing the location of the device within the network.

Example of an IP Address: 192.168.1.1 (IPv4) or 2001:0db8:85a3:0000:0000:8a2e:0370:7334 (IPv6).

IP Address Classes (IPv4):

- ✓ **Class A:** For large networks, ranging from 1.0.0.0 to 126.0.0.0.
- ✓ **Class B:** For medium-sized networks, ranging from 128.0.0.0 to 191.255.0.0.
- ✓ **Class C:** For smaller networks, ranging from 192.0.0.0 to 223.255.255.0.
- ✓ **Class D:** Reserved for multicast groups.
- ✓ **Class E:** Reserved for experimental purposes.

Assigning IP address on computer peripherals

Assigning IP addresses to computer peripherals is essential when connecting devices like printers, cameras, or other network-enabled peripherals to a network, allowing them to communicate effectively within the network. This process ensures that each device can be identified, accessed, and managed properly.

✓ **Dynamic Assignment (DHCP):** Most devices automatically receive IP addresses through DHCP (Dynamic Host Configuration Protocol) from a router or network server. This method is easy and requires minimal configuration.

- Connect the Peripheral**:** Connect the device to the network via Ethernet or Wi-Fi.
- Check Network Settings**:** On the device, ensure it is set to obtain an IP address automatically (DHCP).
- Find Assigned IP Address: Check the DHCP client list on the router to see the assigned IP address.

✓ **Static Assignment:** IP addresses are manually assigned to devices, making them consistent over time. This method is often used for network printers,

security cameras, and servers where a fixed address is necessary.

- Access Device Settings: Log into the peripheral's settings via a web interface, control panel, or dedicated app.
- Set Static IP Address**:** Manually enter an IP address, subnet mask, gateway, and DNS server information.
- Save Configuration: Restart the device if necessary to apply changes.

Steps to assign IP address on computer peripherals

- **Access the Peripheral's Settings Menu**
  - ✓ For Printers: Use the control panel on the printer or access it via a web interface through a browser.
  - ✓ Cameras: Access the device's web interface by typing its default IP address in a web browser.
- **Identify Network Settings**
  - ✓ Once you access the peripheral's interface, look for a section called Network Settings, TCP/IP Settings, or LAN Settings.
  - ✓ Some peripherals may automatically assign an IP address using DHCP (Dynamic Host Configuration Protocol). To assign a static IP, you'll need to change these settings
- **Switch to Manual or Static IP Assignment**
  - ✓ If the device is set to Obtain an IP address automatically (DHCP), switch it to Manual, Static, or Fixed IP mode.
  - ✓ This allows you to assign a specific IP address to the device.
- Assign an IP Address
  - ✓ Choose an IP address that is within the same range as your local network but outside the range of automatically assigned DHCP addresses to avoid conflicts.
  - ✓ Example: If your router's IP range is 192.168.1.1 - 192.168.1.255, and your router assigns IP addresses automatically between 192.168.1.100 and 192.168.1.200, assign an IP outside this range (e.g., 192.168.1.50).
- **Configure Subnet Mask and Gateway**

- ✓ Subnet Mask: Typically 255.255.255.0 for most home or small business networks.
- ✓ Gateway: This is your router's IP address (192.168.1.1).
- ✓ DNS Server: Enter the IP address of your DNS server, usually your router's IP, or use public DNS servers like Google's 8.8.8.8.

- **Save Settings and Restart Device:** After assigning the IP address, save the settings and reboot the peripheral to apply the changes.
- **Test Connectivity**

✓ Use ping or attempt to access the peripheral from a web browser or your computer to confirm the IP address is correctly assigned and the device is reachable on the network.

✓ Configure the device settings: Once the drivers are installed, access the device's configuration or settings menu and Adjust the settings according to your preferences and requirements

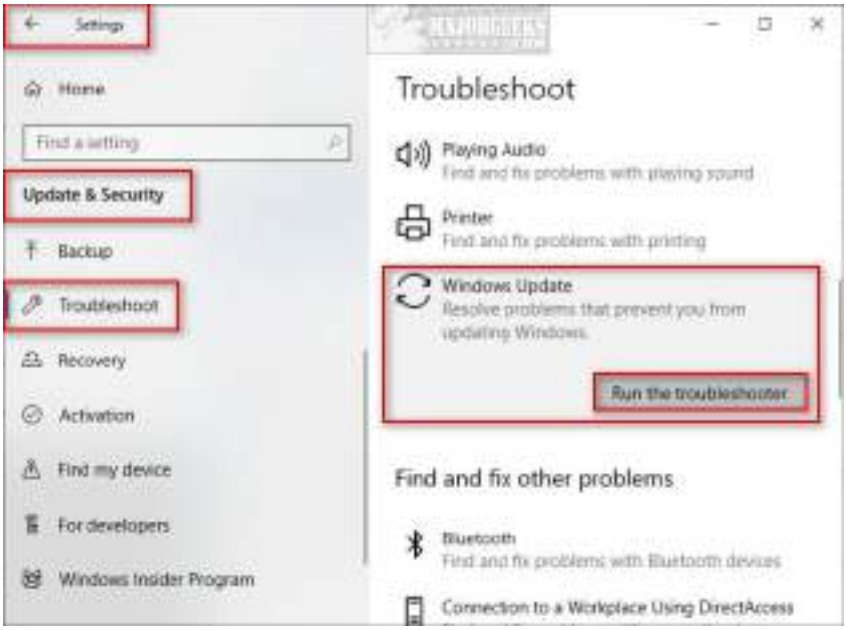
✓ Customize Advanced Settings: Depending on the peripheral device, there may be additional settings or software features to explore and customize and power management options, hotkeys, advanced functionality, or integration with other applications.

- **Patch the device:** Patching a device typically refers to updating the device's software, firmware, or operating system to fix bugs, improve performance, enhance security, or add new features. Patching is a critical aspect of maintaining the health, security, and efficiency of devices, especially those connected to networks, like computers, smartphones, routers, printers, and IoT devices.

  Patching involves applying updates or fixes (patches) to a device's software or firmware. These patches can address vulnerabilities, correct errors, or add enhancements.

Types of computer peripheral patches

- Security Patches**:** Focus on fixing vulnerabilities that could be exploited by cyber threats and critical for protecting sensitive data and maintaining device integrity.

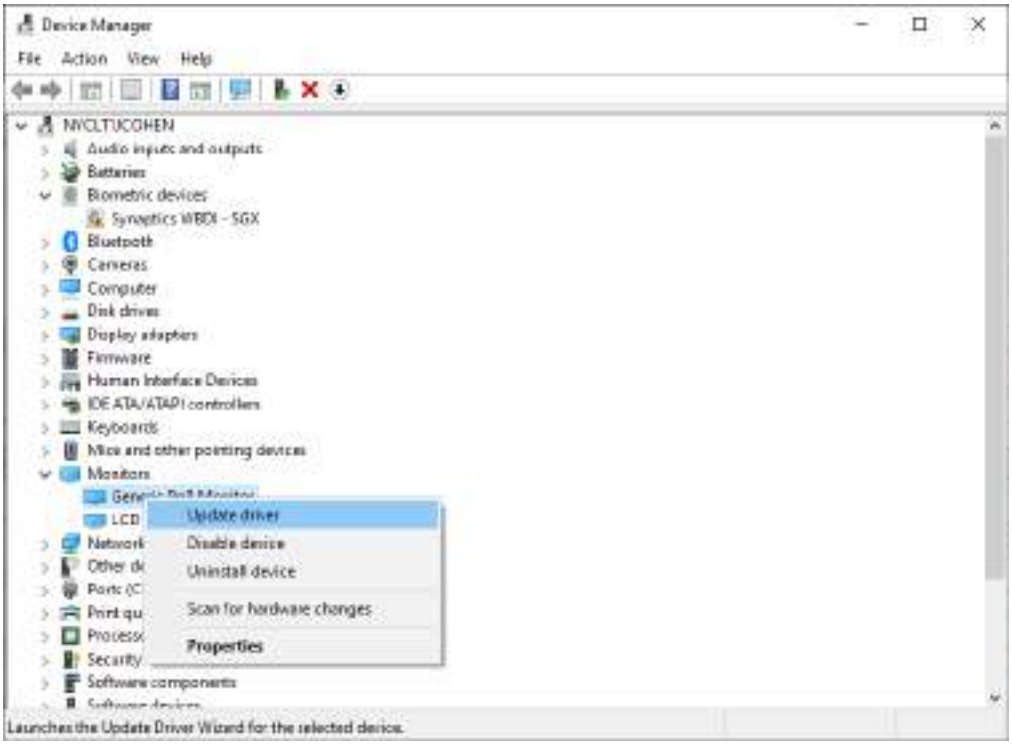


- **Bug Fix Patches**: Address known software bugs that cause malfunctions or degrade performance and ensure the device operates as intended.

- **Feature Patches**: Add new features or update existing ones to improve functionality and often part of regular updates that include performance improvements.

- **Firmware Patches**: Update the firmware, which is the low-level software that controls hardware components and essential for devices like routers, printers, and IoT gadgets.

- **Driver Updates**: Update software that controls hardware peripherals, ensuring they work correctly with the operating system and common for graphics cards, printers, and network adapters.



How to Patch a Device

- Identify the Need for a Patch: Devices typically notify users when patches are available and check for updates manually through the device's settings or management software.
- Download the Patch: Updates are often downloaded directly from the device manufacturer's website, operating system update tool, or

management software and ensure the source of the patch is legitimate to avoid installing malicious software.

- Install the Patch: Follow the installation instructions provided by the device or software and some patches may require a restart of the device to take effect.
- Verify the Update: After installation, confirm that the patch has been applied successfully and check for improved performance, fixed issues, or new features as expected.

- **Set up necessary security standard**

Networked Peripherals devices like network printers or shared storage, set up user permissions and access controls to secure the device and can Enable encryption on external drives to protect sensitive data

Networked peripherals such as printers, scanners, and cameras are integral to organizational operations but can pose significant security risks if not adequately protected. Applying security standards ensures that these devices remain functional and secure within the network.

1. Disable Unused Functionality: Unused functions or services on a device can become potential security vulnerabilities if left enabled. Disabling these features minimizes the attack surface and reduces the likelihood of exploitation.

   - ✓ Access the device's administrative settings.
   - ✓ Review all enabled features (e.g., remote access, unused ports, or protocols).
   - ✓ Disable features that are not required for the device's operation.

Example:

A network printer may have FTP or Telnet enabled by default, even though they are not used. Disabling these protocols eliminates vulnerabilities associated with outdated or insecure protocols.

- ✓ Perform regular audits of enabled features
- ✓ Keep a record of configurations to ensure consistency.
- ✓ Revisit settings after firmware updates, as updates may re-enable certain features.

2. Configure Access Control on the Device

Access control restricts who can access or manage the device. Proper configuration ensures that only authorized users and devices can interact with the peripheral.

The way of Configure Access Control on the Device

- ✓ Enable authentication mechanisms such as usernames and passwords.
- ✓ Create user roles with specific permissions (e.g., admin, user, guest).
- ✓ Limit access to specific IP ranges or devices using ACLs (Access Control Lists).

Example: A company configures access control on its office printers so that only employees' devices within the office network can send print jobs. Guest networks and external IPs are blocked from accessing the printer.

- ✓ Use strong passwords and change default credentials.
- ✓ Regularly review and update access permissions.
- ✓ Implement two-factor authentication (2FA) if supported.

- **Test the peripheral device**

  Perform basic operations to ensure the device is working correctly (print a test page, scan a document, move the mouse pointer, or adjust the volume) and If the device isn't working as expected, revisit the configuration settings, check connections, or consult troubleshooting guides provided by the manufacturer.
- **Save and Apply Settings**

  Once you've configured the device to your satisfaction, ensure you apply the changes and Some devices may require a restart to finalize the configuration
- **Monitor for Updates**

  Regularly check for driver updates or firmware updates from the manufacturer to keep the peripheral functioning optimally and securely.
- **Documentation for the configuration**:

  If you have configured a device with complex settings, consider documenting the configuration.

Practical Activity 2.2.2: Customization of security settings on computer peripherals

Task:

1: With referring to previous task and key readings 2.2.2, you are asked to perform the following task:

Referring to the connected computer peripherals in your school computer lab, you are asked to change all default security settings and customize the security setting of computer peripheral to user defined settings

2: Customize the setting of computer peripheral devices

3: Present your work to the trainer/workshop instructor/classmate

4: Ask for clarification if any.

Key readings 2.2.2: Customization of security settings on computer peripherals

- **Access Device Settings:** Go to Settings **>** Devices**>** Select the type of peripheral (Mouse, Printers & Scanners, Display...) that you want to customize it's setting.
- **Customize Specific Peripheral Settings:**
  - ✓ Mouse: Pointer Speed, Double-Click Speed, Scroll Speed, Button Customization
  - ✓ Keyboard: Key Repeat Rate, Shortcuts, Language/Layout
  - ✓ Display/Monitor: Resolution, Brightness and Contrast, Orientation, Multiple Displays
  - ✓ Printers: Choose default paper size, print quality, and whether to print in color or grayscale and Set up default print mode
  - ✓ Scanners: Configure default scan resolution and color settings and Choose the file format and save location for scanned documents.
  - ✓ Audio Devices (Speakers, Headphones, Microphones): Volume Control, Balance, Equalizer, Enable noise reduction or echo cancellation.
  - ✓ External Storage Devices: File System Format(NTFS, FAT, FAT32 or exFAT), Drive Letter Assignment, Enable encryption to protect sensitive data on the drives
- **Use Manufacturer-Specific Software (HP Printer Assistant for printers):** Install software provided by the manufacturer (HP Printer Assistant for printers) to access advanced settings.
- **Apply and Save Changes:** Once you have customized the settings, ensure you apply and save the changes.
- **Backup Settings:** Some devices and software allow you to save or export your settings configuration, which can be useful if you need to restore them later or apply them to another device.

Points to Remember

Configuration of connected computer peripherals devices

- Identify the peripheral device
- Connect the peripheral device
- Install the necessary drivers
- Access the Device Settings
- Configure the device settings
  - ✓ Assign IP address to computer peripherals
    - Access the computer peripherals menu and navigate to Network Settings.
    - Change IP mode from DHCP to Manual.
    - Assign the IP 192.168.1.50, subnet mask 255.255.255.0, and gateway 192.168.1.1.
    - Save and restart computer peripherals
- Customize Advanced Settings
- Set up necessary security standard
- Test the peripheral device
- Save and Apply Settings
- Monitor for Updates
- Documentation for the configuration

Customization of connected computer peripherals devices setting

- Access Device Settings
- Customize Specific Peripheral Settings(Mouse, Keyboard, Display/Monitor, Printers, Scanners, Audio Devices and External Storage Devices)
- Use Manufacturer-Specific Software(HP Printer Assistant for printers)
- Apply and Save Changes
- Backup Settings

Application of learning 2.2

QUERTY Company has recently upgraded the workstations for its employees. As computer system assembly technician, you are hired to configure a new workstation with scanner and printer and customize the settings of those configured peripherals (mouse, keyboard, display/monitor and audio devices) to enhance productivity and comfort for each user in the optimization of pointer speed and scroll behavior, for the adjustments will you implement to improve efficiency in typing and data entry tasks, to ensure that the brightness, resolution, and color calibration are appropriate for extended use and accurate color representation in design works, to ensure clear communication during virtual meetings and optimal sound quality when reviewing multimedia content(Audio and Video)

Indicative content 2.3: Perform peripheral functionality testing

Duration: 10 hrs

Practical Activity 2.3.1: Testing the functionality of the configured and customized peripheral devices

Task:

1: With referring to key readings 2.3.1, you are asked to perform the following task:
HSK School has finished connecting, configuring and customizing security settings of computer peripherals. As a computer system assembly technician, you are asked to test the functionality of those computer peripheral devices based on customized security settings.
2: Test the functionality of the configured and customized computer peripheral devices
3: Present your work to the trainer/workshop instructor/classmate
4: Ask for clarification if any.

Key readings 2.3.1: Testing the functionality of the configured and customized peripheral devices

- Preparation and Setup: Before testing, verify that the peripherals have been properly configured according to the intended settings, Have any testing software or diagnostic tools on hand and make sure the computer is powered on and running smoothly.
- Visual and Physical Inspection: is an essential step in testing configured and customized computer peripherals, this process involves examining the physical condition and connections of peripherals, as well as checking their setup and functionality and It helps ensure that the devices are correctly installed, configured, and operating as expected.
- Ensure that all cables and connectors are securely attached to the appropriate ports on both the peripheral device and the computer
- Look for any visible signs of wear, damage, or defects on the peripheral device, such as frayed cables, cracks, or broken parts.
- Confirm that the device is powered on and, if applicable, that indicator lights are functioning as expected.
- Testing Specific Peripherals: involves conducting targeted checks and assessments of individual computer peripherals to ensure they function correctly and meet the desired performance standards. This testing can vary based on the type of peripheral, its intended use, and the specific configurations or customizations applied to it.
    - ✓ Printer: Print a test page to check for print quality and paper feed,

Print on different paper sizes or types (photo paper, labels) to ensure the printer handles them correctly.

- ✓ Scanner: Scan a document and check the output for clarity and accuracy, Test different scanning modes (color, grayscale, black & white) to ensure they function properly and scanned files are saved in the correct location and format (PDF, JPEG,…)
- ✓ Mouse/Keyboard: Move the cursor, Type using every key on the keyboard to ensure all keys register correctly, and type to ensure responsiveness.
- ✓ Monitor: Check display resolution, brightness, and color accuracy.
- ✓ Audio Devices: Play audio through speakers or headphones to check for clarity and volume and Record audio using the microphone and play it back to ensure it captures sound clearly.
- ✓ External Storage: Connect the device and check for recognition by the computer and file transfer speed and Ensure the device is formatted with the correct file system (NTFS, FAT32, exFAT) and can be accessed by the system.

- **Check Device Recognition:** Ensure the device is correctly recognized by the operating system. This can be verified through the Device Manager in Windows, System Preferences on macOS, or relevant settings in Linux.
- **Advanced Functionality Testing:** Run diagnostic tests for each peripheral using manufacturer-provided software or third-party utilities to check for deeper issues not evident in basic testing and for peripherals like printers or external drives, perform load testing by running multiple operations simultaneously to test stability under the multiple load.
- **Troubleshoot Any Issues**: It refers to the process of identifying, diagnosing, and resolving problems that prevent a device, system, or software from functioning correctly. The goal of troubleshooting is to restore normal operation by systematically isolating the cause of the issue and implementing a fix.
  - ✓ If any device fails the tests, document the specific issues encountered.
  - ✓ Troubleshoot by checking connections, reinstalling drivers, or adjusting settings as necessary.
  - ✓ After troubleshooting, retest the device to confirm the issue has been resolved
- **Final Verification**: Have the end-users perform typical tasks with the devices to ensure everything is working as expected in their daily environment and Ensure that the peripheral devices function well with other hardware and software used by the company.
- **Report and Documentation(Record Test Results, Maintain a Testing Log):** Document the results of the tests, including any issues encountered and how they were resolved and Keep a log of all tests performed for future reference or

for troubleshooting potential future issues.

Points to Remember

Testing the functionality of the configured and customized peripheral devices

- Preparation and Setup
- Visual and Physical Inspection
- Testing Specific Peripherals(Printer Testing, Scanner Testing, Mouse Testing, Keyboard Testing, Monitor/Display Testing, Audio Device Testing or External Storage Device Testing)
- Advanced Functionality Testing
- Troubleshoot Any Issues
- Final Verification
- Report and Documentation(Record Test Results, Maintain a Testing Log)

Application of learning 2.3

GD Corporation (Graphic Design Company) recently completed the setup of new workstations for their design team. Each workstation is equipped with a high-resolution monitor, an ergonomic keyboard, a precision mouse, a color printer, a scanner, and external storage devices. An employee of this company has configured that new workstation and customized the settings of these peripherals to optimize them for graphic design work.. As computer system and architecture technician, you hired for testing the functionality of these configured and customized peripherals to ensure that they meet the specific needs of the GD Corporation such as the monitor is displaying colors accurately and at the correct resolution, color calibration and adjust settings, The keyboard has been configured with custom shortcuts for design software, the mouse sensitivity and functionality has been adjusted for precision work, The printer has been set to print in high-quality mode by default, and the scanner is configured to save files directly to a shared network folder, The external storage devices are used to back up large design files and Recognized by computer where file transfer speeds and ensuring that files are saved without corruption and all peripherals work together seamlessly without conflicts/interference.

Learning outcome 2 end assessment

Written assessment

I. <u>Multiple choice questions(Choose the correct answer on the following questions)</u>

Q1. What is the primary purpose of installing device drivers for peripherals?

A) To increase storage capacity
B) To ensure the device operates correctly with the operating system
C) To protect the device from malware
D) To improve the computer's speed

Q2. Which of the following settings is commonly adjusted when configuring a display monitor?

A) Brightness
B) IP address
C) File system
D) Boot sequence

Q3. What is the main reason for applying security standards to networked peripherals?

A) To improve performance speed
B) To prevent unauthorized access
C) To reduce power consumption
D) To increase the device's lifespan

Q4. Which security protocol is commonly used to secure data transmitted between networked printers and computers?

A) SSL/TLS
B) FTP
C) POP3
D) SNMP

Q5. When securing a networked printer, what is the purpose of enabling authentication features?

A) To speed up print jobs
B) To ensure only authorized users can access the printer
C) To increase the number of pages the printer can handle
D) To enhance print quality

Q6. Which tool would you most likely use to test the functionality of a newly installed mouse?

A) Disk Defragmenter
B) Device Manager
C) Mouse Properties in Control Panel

D) Network Diagnostics

Q7. What is the first step in troubleshooting a malfunctioning peripheral device?

A) Replacing the device
B) Checking the power connection
C) Updating the operating system
D) Installing antivirus software

Q8. Which of the following would you check if a printer is not printing, despite being connected and powered on?

A) Printer queue for pending jobs
B) System BIOS settings
C) Hard drive space
D) Internet connection speed

Q9. What is the primary purpose of configuring computer peripheral settings?

A) To optimize device performance
B) To restrict user access
C) To enable remote management
D) All of the above

Q10. Which of the following is not a common computer peripheral setting?

A) Resolution
B) Brightness
C) Wifi password
D) Color profile

Q11. Which of the following is not a common test for peripheral functionality?

A) Print quality assessment
B) Peripheral driver installation
C) Network connectivity test
D) Battery life measurement

Q12. What is the recommended frequency for performing peripheral functionality tests?

A) Daily
B) Weekly
C) Monthly
D) Annually

Q13. Which of the following is not a common metric used in peripheral functionality testing?

A) Response time
B) Power consumption
C) Compatibility with software
D) User satisfaction

Q14. Which of the following is an example of customizing a peripheral device?

a) Replacing the device's hardware components
b) Changing the operating system
c) Adjusting the mouse sensitivity
d) Rebooting the computer

Q15. How can you change the default printer on a Windows computer?

a) Right-click the printer in Devices and Printers and select Set as default printer
b) Open Task Manager and click Set Default Printer
c) Use the Command Prompt to change printer settings
d) Change the printer's IP address

Q16. Why is it important to assign a static IP address to a networked printer?

a) To increase print speed
b) To ensure the printer has a consistent address for network access
c) To allow the printer to switch between networks
d) To enable remote firmware updates

Q17. Which security measure is recommended for networked peripherals like printers or scanners?

a) Enable all available features for enhanced functionality
b) Assign a dynamic IP address for security
c) Regularly patch the device with firmware updates
d) Disable access control for easier access

Q18. What should you do to limit unauthorized access to a networked peripheral?

a) Enable access control to restrict user permissions
b) Disable all encryption settings
c) Allow open access to everyone on the network
d) Use default usernames and passwords

Q19. What is the main purpose of disabling unused functionality on a peripheral device?

a) To increase the processing speed of the device
b) To reduce the risk of security vulnerabilities
c) To allow more users to access the device
d) To improve the display resolution

Q20. How do you perform a test on a newly installed printer?

a) Open Task Manager and end printer services
b) Open Devices and Printers and print a test page
c) Unplug the printer and plug it back in
d) Change the printer's IP address and reboot

Q21. What is the first step in performing functionality testing on a newly connected peripheral?

a) Reinstall the operating system
b) Ensure the device is properly connected and powered on
c) Disable all network connections
d) Update all other peripheral drivers

Q22. Which of the following actions would enhance the security of a network-connected peripheral device?

a) Assigning a static IP address and enabling encryption
b) Using the default settings provided by the manufacturer
c) Disabling firmware updates to prevent errors
d) Allowing all users on the network to access the device

Q23. What tool can you use in Windows to diagnose a peripheral that is not functioning correctly?

a) Task Manager
b) Control Panel
c) Device Manager
d) File Explorer

II. True or False Questions

Q1. Answer the following question by True or False

a) The default resolution settings of a monitor cannot be changed.
b) Device drivers are required for a computer to communicate with peripheral devices.
c) A strong password to a networked printer is a recommended security measure.
d) Encryption is not necessary for data transmitted between a computer and a networked printer.
e) If a peripheral device is not functioning properly, reinstalling the device driver can help resolve the issue.
f) Peripheral functionality testing is only necessary when a device is first installed.
g) A successful print test confirms that both the printer and its connection to the computer are working properly.
h) Configuring peripheral settings can help improve device performance and energy efficiency.
i) Functionality testing is only necessary for new computer peripheral purchases.
j) Measuring peripheral power consumption is a key part of functionality testing.

III. Matching questions

1. Match column A and Column B on the corresponding items

Solution	Column A	Column B
1 …….	1. Peripheral settings	A. Applying updates to a peripheral's software to address security vulnerabilities and improve functionality.
2……	2. Customization	B. The process of setting up a peripheral's basic parameters and connections.

3 ……	3. Configuration	C. Devices that are connected to a computer network and can communicate with other devices.
4 ……..	4. Patch the device	D. Guidelines and best practices for protecting computer systems and peripherals from unauthorized access or damage.
5……..	5. Security standards	E. The process of configuring a peripheral to work optimally with a computer system.
6……..	6. Networked peripherals	F. The process of tailoring a peripheral's settings to individual preferences or specific needs.
7……..	7. IP Address Assigning	G. Verifying that a peripheral is working as expected and performing its intended functions.
		H. Providing a unique numerical identifier to a networked peripheral.

IV. <u>Open end Questions</u>

Q1. How would you configure the settings for a new display monitor to ensure optimal performance?

Q2. Explain the purpose of configuring computer peripheral settings?

Q3. Do you think security standards are necessary for all networked peripherals?

Q4. Why is it important to regularly update the drivers for your peripheral devices?

Q5. Design a step-by-step process for testing the functionality of a webcam

Practical assessment

You have been assigned as the lead Computer System Assembly Technician for a new project at a financial services company called BC SAVING COOPERATIVE. The project involves setting up a secure workstation for a high-level executive who will handle sensitive financial data. This workstation will require multiple peripheral devices, including a networked printer, dual monitors, a high-resolution scanner, and a wireless keyboard and mouse. Given the nature of the work, security is paramount, and all devices must be thoroughly tested to ensure full functionality. You need to set up dual monitors for multitasking, a high-resolution scanner for document digitization, and a wireless keyboard and mouse for the executive's comfort and flexibility, you will configure a networked printer that will be shared with the executive's team but must be directly accessible from the executive's workstation, Given the sensitivity of the

financial data, you need to ensure that the networked printer and all other peripherals connected to the workstation are secured against unauthorized access. And After setting up and securing all peripherals, you must test each device to ensure it operates correctly and securely within the networked environment.

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Indicative contents

3.1 Introduction to computer peripherals maintenance
3.2 Selection of tools, material and equipment of Computer peripherals maintenance
3.3 Identification of common problems of printer
3.4 Implementation of solutions for common printer problems
3.5 Identification of common problems of projector
3.6 Implementation of solutions for projector problems
3.7 Identification of common problems of scanner
3.8 Implementation of solution for scanner problems
3.9 Application of preventive measures
3.10 Perform preventive peripheral maintenance
3.11 Perform corrective maintenance

Key Competencies for Learning Outcome 3: Maintain computer peripherals

Knowledge	Skills	Attitudes
• Describing computer peripherals maintenance • Identifying of common problems of printer • Identifying of common problems of projector • Identifying of common problems of scanner	• Selecting tools, material and equipment of Computer peripherals maintenance • Implementing solutions for common printer problems • Implementing solutions for common projector problems • Implementation solutions for common scanner problems • Applying preventive measures • Performing preventive peripheral maintenance • Perform corrective maintenance	• Being Self confident in maintain computer peripherals • Being Problem solver in maintain computer peripherals • Having curiosity in maintain computer peripherals • Being patient in maintain computer peripherals • Having time management in maintain computer peripherals • Being Accurate in maintain computer peripherals • Being Attentive in maintain computer peripherals

Duration: 20hrs

Learning outcome 1 objectives:

By the end of the learning outcome, the trainees will be able to:

1. Describe correctly computer peripherals maintenance as used in computer system
2. Select correctly tools, material and equipment of Computer peripherals maintenance according to the task to be done
3. Identify properly common problems of printer based on its functionality
4. Implement properly solutions of common printer problems based on diagnostic findings
5. Identify properly common problems of projector based on its functionality
6. Implement properly solutions of common projector problems based on diagnostic findings
7. Identify properly common problems of scanner based on its functionality
8. Implement properly solutions of common scanner problems based on diagnostic findings
9. Apply properly preventive measures according to peripheral user manual
10. Perform correctly preventive peripheral maintenance according to peripherals functionalities
11. Perform correctly corrective maintenance according to peripherals functionalities

Resources

Equipment	Tools	Materials
• Computer • PPEs • Power protection devices (UPS, SPS, SPD) • Scanner • projector	• Cable tester • Repair Toolkit • Cleaning tools • ESD Tools • Diagnostic tools • Hand tools	• Internet bundles • Power extension • Cleaning materials

Indicative content 3.1: Introduction to computer peripherals maintenance

Duration: 1 hr

Theoretical Activity 3.1.1: Explanation of computer peripherals maintenance

Tasks:

1: You are asked to answer the following questions related to the description to computer peripherals maintenance.

i. State the difference between maintenance and repair
ii. What is activation?
iii. Distinguish troubleshoot to diagnose
iv. Differentiate update and upgrade in computer peripherals

2: Provide the answer for the asked questions on their paper

3: Present the findings/answers to the whole class

4: Ask the questions where are necessary and make clarification if any.

5: For more clarification, Read the key readings 3.1.1

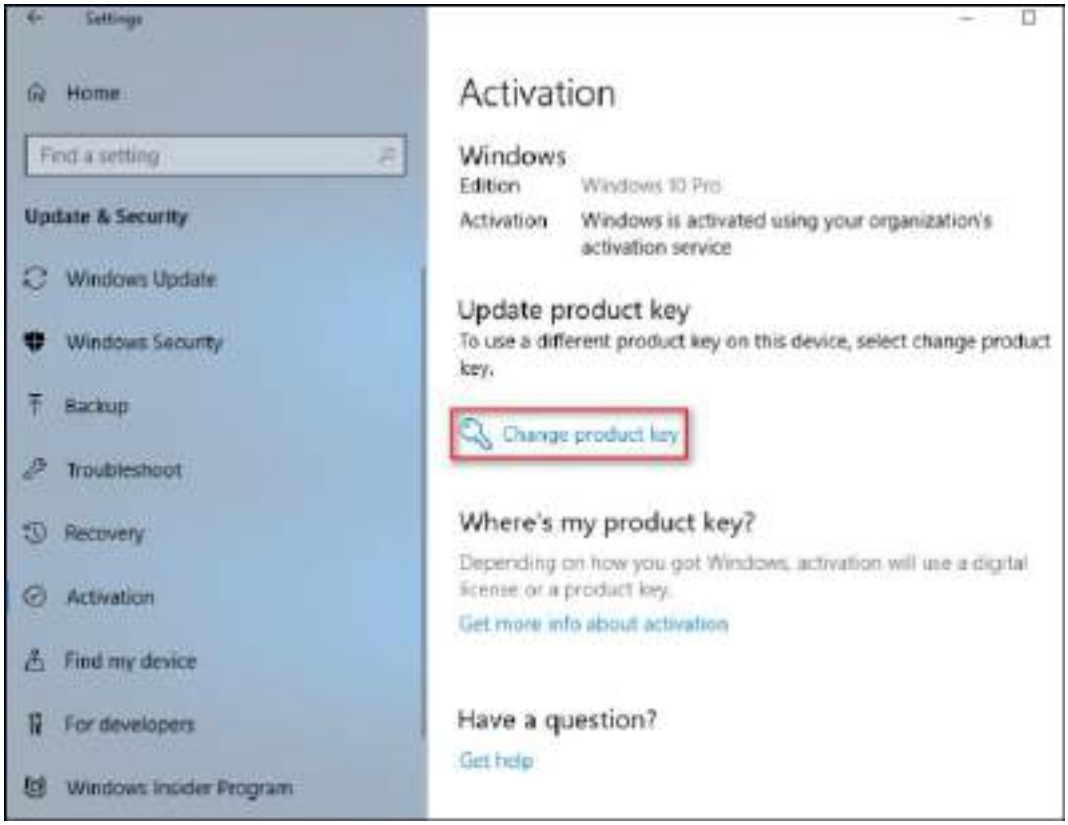
Key readings 3.1.1: Explanation of computer peripherals maintenance

- **Maintenance :** It refers to the regular and ongoing process of keeping a system, device, or software in optimal working condition. It involves performing routine checks, cleaning, updates, and preventive measures to avoid potential issues and extend the lifespan of the equipment. Maintenance can be preventive, focusing on avoiding problems before they occur, or corrective, addressing issues as they arise.

Example: Cleaning dust from a computer's internal components, applying software updates, or running regular system checks are all part of maintenance activities while **Repair** involves fixing a device, system, or software that is malfunctioning or has stopped working. It usually follows the troubleshooting and diagnosis processes. Repair can include replacing damaged parts, correcting software errors, or restoring lost functionality to bring the device or system back to its normal operating state.

Example: Replacing a damaged screen on a laptop or reinstalling a corrupted operating system to restore functionality are examples of repair.

- **Activation** is the process of enabling a software product or service to operate fully after installation. Activation typically requires entering a product key or connecting to a server to verify that the software is legally purchased and installed. This step is often necessary to unlock all features of the software and ensure compliance with licensing agreements.



Example: Entering a license key to activate a new software program or operating system is a common activation process.

- **Troubleshoot** is the process of identifying, analyzing, and resolving issues or problems in a system, device, or software. Troubleshooting involves systematic steps to isolate the cause of a problem, which may include testing different components, checking for software conflicts, and analyzing error messages. The goal of troubleshooting is to diagnose the problem accurately so that it can be fixed.

Example: If a printer is not printing, troubleshooting might involve checking if the printer is properly connected, if there are any error messages, or if the printer drivers are up to date while **Diagnose** is the process of determining the root cause of a problem in a system, device, or software. Diagnosis is a critical step in troubleshooting, as it involves gathering information, running tests, and analyzing symptoms to accurately identify the issue. Once the problem is diagnosed, appropriate repair or corrective actions can be taken.

Example: Using diagnostic tools to determine why a computer is running slowly or why an application is crashing would be part of the diagnosis process.

- **Update** refers to the process of applying minor changes or improvements to a software program or system. Updates typically fix bugs, enhance security, or add small new features. They are crucial for maintaining the security and performance of software and ensuring compatibility with other systems or applications.

Example: Downloading and installing a security patch for an operating system or applying an update to a software application to fix bugs are examples of updates while **Upgrade** involves moving to a newer, better version of software or hardware. Unlike updates, which are usually incremental, upgrades bring significant changes, such as new features, enhanced performance, or increased capacity. Hardware upgrades may involve replacing components like RAM or a hard drive, while software upgrades typically involve installing a new version of an application or operating system.

Example: Upgrading from an older version of an operating system to the latest version, or replacing an old hard drive with a larger, faster one, are examples of upgrades.

Points to Remember

- **Maintenance:** Prevents issues before it occurs (cleaning, software updates, inspections, and repairs) while **Repair** restores functionality by addressing specific issues or replacing faulty components
- **Activation:** Turns on or unlocks features, making a product ready for use.
- **Troubleshoot**: Involves fixing the problem or implementing a solution based on the diagnosis while **Diagnose** Identifies what the problem is and why it occurs.
- **Update:** An update is a minor change or improvement made to an existing version of software unlike **upgrade** usually bring new features, major improvements, changes to the user interface, and possibly even a complete redesign.

Application of learning 3.1

ANADIG Group is a company that selling the electronic and telecommunication devices , They has met with intermittent issues with their office printer where a printer sometimes jams, produces blurry printouts, and occasionally fails to connect to the network. As computer system assembly technician, you are sked to know the cause of those issues.

Indicative content 3.2: Selection of tools, material and equipment of computer peripherals maintenance

Duration: 2 hrs

Theoretical Activity 3.2.1 Identification of tools, material and equipment of Computer peripherals maintenance

Tasks:

1: You are asked to answer the following questions for identifying tools, materials and equipment used in computer peripherals maintenance

ii. Describe tools, materials and equipment used in computer peripherals maintenance

2: Provide the answer of the asked questions and write them on papers

3: Present the findings to the whole class

4: Ask the questions where are necessary and make clarification if any.

5: For more clarification, read the key readings 3.2.1

Key readings 3.2.1: Identification of tools, material and equipment of Computer peripherals maintenance

- **Tools**
  Tools refer to the handheld or powered devices that are used to perform specific tasks during the maintenance, repair, or installation of computer peripherals. These tools are essential for tasks such as disassembling components, adjusting, or diagnosing issues.
  Example: Screwdrivers, pliers, multimeters, and cable testers are common tools used in computer peripherals maintenance.
- **Materials**
  Materials refer to the consumable items that are used up during the maintenance or repair process. These materials may include items needed for cleaning, protecting, or assembling computer peripherals. Unlike tools, materials are typically consumed or disposed of after use.
  Example: Cleaning wipes, thermal paste, screws, cable ties, and lubricants are examples of materials used in maintaining computer peripherals.
- **Equipment**

Equipment refers to the larger or more complex devices and machines that are used to perform maintenance tasks on computer peripherals. Unlike handheld tools, equipment is often powered and may be more specialized, used for tasks that require more precision, power, or scale.

Example: An antistatic mat, soldering iron, or power supply tester are examples of equipment used in computer peripherals maintenance

Practical Activity 3.2.2: Selection of tools, materials and equipment used in computer peripherals maintenance

Task:

1: With referring to key readings3. 2.2, you are asked to perform the following task:
As computer system and architecture trainee, you are asked to select tools, materials and equipment used in computer peripherals maintenance of your school's computer lab.
2: Perform the task given of select tools, materials and equipment
3: Present your work to the trainer/workshop instructor/classmate
4: Ask for clarification if any.

Key readings 3.2.2: Selection of tools, materials and equipment used in computer peripherals maintenance

The criteria for selecting tools, materials and equipment for using in computer peripherals maintenance:

- **Understand the Definition**
  - Tools: Hand-held or powered devices used to perform specific tasks or operations.
    Examples: Screwdrivers, pliers, wrenches, Compressed Air, Soft Brushes, Lint-Free Swabs, Multimeter, Cable Tester, Tweezers, Needle-Nose Pliers, Microfiber Cloths
  - Materials: Substances or compounds used to support, modify, or enhance the functionality of tools or equipment.
    Examples: Thermal paste, cleaning agents, adhesives, ,
  - Equipment: Larger machines or devices designed to perform substantial or complex functions.
    Examples: Printers, projectors, computers, Antistatic Wrist Straps,
- **Categorize Items**
  - Tools : Look for hand-held or small powered devices used for specific tasks.

- Examples: Screwdrivers (used for tightening or loosening screws), pliers (used for gripping or cutting), wrenches (used for turning nuts and bolts).
- Grouping: Collect and group these items based on their specific function.

- Materials
  - Identification: Look for substances or compounds that are used to support or modify the functionality of tools or equipment.
  - Examples: Thermal paste (used for heat management in computers), cleaning agents (used for cleaning surfaces), adhesives (used for bonding materials).
  - Grouping: Collect and group these items based on their application and type.
- Equipment
  - Identification: Look for larger devices or machines that perform complex tasks or operations.
  - Examples: Printers (used for printing documents), projectors (used for displaying visuals), computers (used for processing information).
  - Grouping: Collect and group these items based on their function and size.

- **Organize and Label**
  - Create Categories:
    - Tools: Place all hand-held or small powered tools together.
    - Materials: Place all substances or compounds used for support together.
    - Equipment: Place all large machines and devices together.
  - Label Clearly:
    - Use labels or tags to mark each category clearly. For example, label a box or shelf as "Tools," "Materials," or "Equipment."
    - Ensure each item within these categories is labeled if necessary for easy identification.
- **Perform a Final Check**
  - Review Categories:
    - Ensure there are no items misplaced between tools, materials, and equipment.
  - Verify Labels:
    - Make sure all labels are clear and accurately describe the contents of each storage area.

Points to Remember

- **Identification of tools, material and equipment of Computer peripherals maintenance**

- ✓ **Tools**: Tools can be manual, like a hammer or screwdriver, or digital, like software utilities and coding environments.
- ✓ **Materials:** Materials are the substances or items that are consumed.
- ✓ **Equipment**: Equipment is typically not handheld and often requires setup or installation.

- In selection of different tools, materials, and equipment in a computer lab, follow these steps to correctly categorize and group them:
  - ✓ **Tools:**
    - **Size:** Typically, small and hand-held.
    - **Purpose:** Perform specific actions or adjustments.
    - **Examples:** Screwdrivers, hammers, pliers.
  - ✓ **Materials:**
    - **Size:** Can vary from small parts to bulk substances.
    - **Purpose:** Used to create, support, or modify objects or processes.
    - **Examples:** Thermal paste, cleaning agents, adhesives.
  - ✓ **Equipment:**
    - **Size:** Generally larger and often involves complex machinery.
    - **Purpose:** Perform substantial or complex tasks or operations.
    - **Examples:** Printers, projectors, CNC machines.

Application of learning 3.2

LAISERJET PRINTING Group is company that delivering the printing services located near of your school, They need a maintenance of their computer peripherals (monitor, keyboards, mice, printers, cable, external speakers and projectors). As Computer system Assembly technician, you are hired to maintain those computer peripherals, you are asked to select the tools, materials, and equipment will be used according to it's functionality or use in order to make and accomplish the maintenance of this company refer to their needs.

Indicative content 3.3: Identification of common problems of printer

Duration: 1 hr

Theoretical Activity 3.3.1 Description of common Hardware issues of printer

Tasks:

1: You are asked to answer the following questions related to the Description of common problems of printer

i. What is a computer?
ii. Explain the types of printer
iii. Describe the hardware issue of the printer

2: Provide the answer for the asked questions as their findings

3: Present the findings/answers to the whole class

4: Ask the questions where are necessary and make clarification if any.

5: For more clarification, Read the key readings 3.3.1

Key readings 3.3.1: Description of common Hardware issues of printer

A printer is a computer peripheral device that converts digital documents and images into physical, tangible copies, usually on paper.

- **Types of Printers**
  - ✓ Inkjet Printers:
    Use liquid ink sprayed through microscopic nozzles onto the paper, It is mostly used for high-quality photo printing, home use, and small office environments. Excellent color output, capable of printing on various media types, relatively low initial cost but Ink cartridges can be expensive, slower than laser printers, prone to clogging if not used regularly.

  - ✓ Laser Printers:
    Use laser beams and toner powder to transfer text and images onto paper, Best for high-volume printing, offices, and environments requiring fast,

high-quality black-and-white output and Fast printing speed, cost-effective for large volumes, sharp text quality, low per-page cost but Higher upfront cost, color laser printers are more expensive than inkjets, and toner replacements can be costly.

- ✓ Dot Matrix Printers:
  Impact printers that use a print head to strike an ink ribbon, creating dots on the paper to form text and images, Commonly used in industrial settings, for multi-part forms, receipts, and invoices.

- ✓ Thermal Printers:
  Use heat to transfer an image onto special heat-sensitive paper or through thermal ribbons (Direct Thermal Burns images directly onto special thermal paper or Thermal Transfer Uses a ribbon that melts ink onto the paper), Widely used for receipts, shipping labels, barcodes, and in POS (Point of Sale) systems.
- ✓ 3D Printers:
  Create three-dimensional objects by layering material, usually plastic, metal, or resin, based on a digital model, Prototyping, manufacturing, education, medical applications, and more
- ✓ Multifunction Printers (MFPs):
  Combine printing, scanning, copying, and sometimes faxing in one device.
- ✓ Plotters:

Large-format printers used to produce high-precision line drawings and graphics, typically for CAD designs. Used by architects, engineers, and designers for blueprints, posters, and banners.

- ✓ Dye-Sublimation Printers:
  Use heat to transfer dye onto materials like paper, fabric, or plastic. It uses High-quality photo printing, ID cards, and fabric printing
- ✓ Solid Ink Printers:
  Use solid sticks of ink that are melted and transferred onto the paper

- **Printer hardware issues could occur:**
  - ✓ The printer fails to power on or intermittently loses power may indicate the issues with the power outlet
  - ✓ Frequent paper jams may indicate issues with rollers, feeders, or improper paper loading, The printer stops printing, and an error message may appear indicating a paper jam.
  - ✓ Worn-Out Rollers:
    Rollers are responsible for feeding paper through the printer. Over time, they can become worn out or dirty, leading to paper feeding issues
  - ✓ Power Supply Problems:
    Issues with the printer's power supply can prevent it from turning on or cause it to shut down unexpectedly, The printer won't power on, or it powers off during operation
  - ✓ Blurry or streaky prints often point to issues with the print head, ink/toner cartridges, or paper quality.
  - ✓ Mechanical Failures:
    Internal mechanical components such as gears, belts, and motors can wear out or break, leading to various operational issues lead Strange noises, inability to feed paper, or complete failure to print.
  - ✓ Unresponsive buttons or display errors may indicate issues with the control panel or internal electronics.
  - ✓ Connectivity Issues: Hardware connectivity problems, such as loose or damaged cables, can prevent the printer from communicating with the computer or network, the printer is not detected by the computer, or it fails to receive print jobs.
  - ✓ Ink or Toner Cartridge Problems:
    Ink or toner cartridges may be improperly installed, empty, or faulty lead to Poor print quality, error messages related to the cartridges, or the printer not recognizing the cartridges
  - ✓ Problems with the print queue can cause delays, prevent documents from printing, or result in printing out of order
  - ✓ Overheating:

Prolonged use or inadequate ventilation can cause the printer to overheat, leading to malfunctions or shutdowns.

Theoretical Activity 3.3.2 Description of common software issues of printer

Tasks:

1: You are asked to answer the following question related to the Description of common software problems of printer

I. Describe the software issues of the printer in computer peripherals maintenance

2: Provide the answer for the asked questions as their findings

3: Present the findings/answers to the whole class

4: Trainees ask the questions where are necessary and make clarification if any.

5: For more clarification, Read the key readings 3.3.2

Key readings 3.3.2: Description of software issues of printer

- **Driver Issues**
  - ✓ **Description**: Printer drivers are essential software that allows the computer to communicate with the printer. Problems arise when drivers are outdated, corrupted, or incompatible with the operating system.
  - ✓ **Symptoms**: The printer may not print at all, print incorrect formats, or produce errors. The printer might also be unrecognized by the computer or display as an "Unknown Device."
- **Compatibility Problems**
  - ✓ Description: Compatibility issues occur when the printer's software doesn't fully support the operating system or specific applications. This can happen with newer OS versions or specific software programs.
  - ✓ **Symptoms**: The printer may fail to print certain documents, or specific features like duplex printing might not work properly.
- **Print Spooler Errors**
  - ✓ Description:
    The print spooler is a service that manages print jobs. If this service crashes or gets stuck, it can prevent printing.
  - ✓ Symptoms:

Print jobs may get stuck in the queue, or the printer may fail to respond. An error message about the print spooler may appear.

- **Network Configuration Issues**
  - ✓ Description:
    For networked printers, software settings related to network configuration are crucial. Issues arise when these settings are incorrect, or the network connection is unstable.
  - ✓ Symptoms:
    The printer may not be detected on the network, or it may lose connection frequently, leading to failed print jobs.
- **Firmware Problems**
  - ✓ Description:
    Firmware is the embedded software that controls the printer's hardware. Problems occur when the firmware is outdated or corrupted.
  - ✓ Symptoms:
    The printer may freeze, reboot unexpectedly, or certain functions may not work. In some cases, the printer may not respond at all.
- **Software Conflicts**
  - ✓ **Description**:
    Conflicts can occur when multiple software applications or utilities related to printing are installed on the same computer. These conflicts can disrupt normal printer operations.
  - ✓ **Symptoms**:
    The printer may behave unpredictably, or errors may occur when printing from certain programs.
- **Incorrect Printer Settings**
  - ✓ **Description:**
    Incorrect settings in the printer's software or on the computer can lead to unexpected print results, such as wrong paper size, orientation, or color management issues.
  - ✓ Symptoms:
    The output may be misaligned, cut off, or in the wrong format (grayscale instead of color).
  - ✓ Problems with drivers can cause the printer to malfunction or be unrecognized by the computer.
  - ✓ Issues with the spooler can prevent print jobs from being processed or cause them to get stuck in the queue.
  - ✓ Missing features or settings in the printer software indicate Incompatibility between printer drivers and the OS
  - ✓ A malfunctioning print spooler can cause print jobs to get stuck in the queue**.**

- ✓ Specific error messages or codes displayed by the printer or computer may indicate software issues
- ✓ Inability to print from a remote location.
- ✓ Misconfiguration of network setting may block the printer if the printer is part of a network

Points to Remember

Description of common hardware problems of printer

- A printer is a computer peripheral device that converts digital documents and images into physical, tangible copies, usually on paper.
- Types of Printer are Inkjet Printers, Laser Printers, Dot Matrix Printers, Thermal Printers or Photo Printers
- Printer hardware issues can occur:
  - ✓ The printer fails to power on or intermittently loses power may indicate the issues with the power outlet
  - ✓ Frequent paper jams may indicate issues with rollers, feeders, or improper paper loading.
  - ✓ Blurry or streaky prints often point to issues with the print head, ink/toner cartridges, or paper quality.
  - ✓ Unresponsive buttons or display errors may indicate issues with the control panel or internal electronics.
  - ✓ Problems with the print queue can cause delays, prevent documents from printing, or result in printing out of order

Description of common software problems of printer

- **Driver Issues**
  - ✓ The printer fails to print or displays an error message indicating a problem with the driver.
  - ✓ Print jobs are sent but never reach the printer, or the printer outputs blank pages.
  - ✓ The printer may not be recognized by the computer or appears as an "Unknown Device" in the device manager.
  - ✓ Reinstalling or updating the printer driver resolves the issue, confirming a driver-related problem.
- **Firmware Problems**
  - ✓ The printer exhibits unexpected behavior, such as freezing, rebooting, or not responding to commands.

- ✓ Certain features or functions may stop working after a firmware update or may not work at all if the firmware is outdated.
- ✓ Error messages may indicate firmware corruption or compatibility issues.
- ✓ Updating or reinstalling the printer's firmware can fix these problems.

- **Software Conflicts**
  - ✓ The printer works erratically or not at all when multiple printing-related applications or utilities are installed on the same computer.
  - ✓ Errors or crashes occur when attempting to print from specific programs, suggesting a conflict between the software and the printer driver.
  - ✓ Disabling or uninstalling conflicting software often resolves the issue.
- **Incorrect Printer Settings**
  - ✓ The printer produces unexpected results, such as printing in grayscale instead of color, or using the wrong paper size.
  - ✓ Print jobs may be misaligned, cut off, or scaled incorrectly due to incorrect printer settings in the print dialog box.
  - ✓ Adjusting the printer settings to match the desired output format or media type resolves these issues.
  - ✓ Problems with drivers can cause the printer to malfunction or be unrecognized by the computer.
  - ✓ Issues with the spooler can prevent print jobs from being processed or cause them to get stuck in the queue.
  - ✓ Missing features or settings in the printer software indicate Incompatibility between printer drivers and the OS
  - ✓ A malfunctioning print spooler can cause print jobs to get stuck in the queue**.**
  - ✓ Specific error messages or codes displayed by the printer or computer may indicate software issues
  - ✓ Inability to print from a remote location.
  - ✓ Misconfiguration of network setting may block the printer if the printer is part of a network

Application of learning 3.3

ATZ TSS has a printer that is used for printing reports, documents and notes, the printer is experiencing issues with their network printer. Students and teachers are unable to print documents, and the printer frequently displays error messages. As computer system assembly technician, you are asked to identify the problem of this printer

Indicative content 3.4: Implementation of solutions for common printer problems

Duration: 2 hrs

Practical Activity 3.4.1: Application of solutions for common Hardware issues of printer

Task:

1: With referring to key readings 3.4.1, you are asked to perform the following task:
As a computer system assembly technician, you are asked to apply solutions for identified hardware issues for your school's printer and make sure that the printer is working properly to use in a daily school's activities.
2: Apply solutions for Hardware issues of the printer
3: Present your work to the trainer/workshop instructor/classmate
4: Ask for clarification if any.

Key readings 3.4.1: Application of solutions for Hardware issues of printer

- **Paper Jams**
  - ✓ **Solution:**
    - Open the printer's access panels to remove the jammed paper.
    - Clean and inspect rollers for wear.
- **Worn-Out Rollers**
  - ✓ **Solution**: Clean the rollers or replace them if they are worn out.
- **Printhead Issues**
  - ✓ **Solution:**
    - Clean the printhead using the printer's maintenance tools or manually
    - Realign or replace the printhead if necessary.
- **Power Supply Problems**
  - ✓ **Solution:**
    - Check the power cord and outlet,
    - Replace the power supply unit if it is faulty.
- **Connectivity Issues**
  - ✓ **Solution:**
    - Check and replace any damaged cables,
    - ensure that connections are secure,
    - Verify the correct setup.
- **Ink or Toner Cartridge Problems**
  - ✓ **Solution:**

- Reinstall or replace the cartridges,
- Ensure they are correctly seated in the printer.

- **Overheating**
  - ✓ **Solution:**
    - Allow the printer to cool down
    - Ensure proper ventilation
    - Avoid overuse in a short period.

Practical Activity 3.4.2: Application of solution for software issues of printer

Task:

1: With referring to key readings 3.4.2, you are asked to perform the following task:
As a computer system assembly technician, you are asked to apply solutions for identified software issues for your school's printer and make sure that the printer is working properly to use in a daily school's activities.
2: Apply solutions for software issues of the printer
3: Present your work to the trainer/workshop instructor/classmate
4: Ask for clarification if any.

Key readings 3.4.2: Application of solution for software issues of printer

- **Driver Issues:** Updating, reinstalling, or replacing the driver with a compatible version typically resolves these issues.
- **Compatibility Problems:** Checking for updated drivers or software patches that ensure compatibility or using an alternative driver or software version.
- **Print Spooler Errors:** Restarting the print spooler service, clearing the print queue, or troubleshooting the service directly.
- **Network Configuration Issues:** Reconfiguring the network settings, ensuring the correct IP address, or stabilizing the wireless connection.
- **Firmware Problems:** Updating the firmware to the latest version or reinstalling it if it's corrupted.
- **Software Conflicts:** Identifying and disabling or uninstalling conflicting software to restore normal functionality.
- **Incorrect Printer Settings:** Adjusting the printer settings within the software or print dialog box to match the desired output

Points to Remember

- **Solutions for Hardware issues**
  - ✓ Check and replace the power cord, if necessary, test the printer with a different power outlet, and consider professional repair for internal power supply issues.
  - ✓ Clear the jammed paper according to the manufacturer's instructions, inspect and clean the rollers, and ensure proper paper alignment.
  - ✓ Clean the print head using the printer's maintenance tools, align the print head, and replace it if cleaning doesn't resolve the issue.
  - ✓ Reset the printer, check connections, and consider replacing the control panel or buttons if they are physically damaged
  - ✓ Ensure the paper is properly loaded and aligned, inspect the tray for damage, and repair or replace faulty feeder components
- **Solutions for Hardware issues**
- **Power Cycle the Printer**: Always start by turning the printer off and then back on to reset any temporary hardware glitches.
- **Clean Regularly:** Regularly clean the printer's internal components, such as the printhead, rollers, and paper feed tray, to prevent issues caused by dust or debris buildup.
- **Verify Paper Path:** Check the paper path for jams or misfeeds, and ensure the paper is properly loaded and aligned to prevent feeding issues.
- **Ensure Compatibility:** Always check that the software, drivers, and firmware are compatible with the operating system and the specific model of the printer.
- **Update Regularly:** Keep printer drivers, firmware, and related software up to date to avoid issues caused by outdated versions.
- **Backup Settings:** Before making significant changes to the printer's software or settings, back up the current configurations to easily restore them if needed.
- **Check Network Settings:** For networked printers, verify that the IP address, network configuration, and Wi-Fi settings are correct and stable.

Application of learning 3.4

GUD Company, a business specializing in document management services, recently upgraded its office with new multifunction printers to streamline its daily operations. However, after the installation, several employees started experiencing issues when trying to print documents, particularly when using the company has networked printers. Several employees at GUD Company are unable to print documents from their workstations. The printers either display an error message or do not respond at all. This issue is causing delays in work, especially for the accounts and sales departments, which rely heavily on printing invoices, bills and reports. As a Computer system assembly technician, you are hired to handle their printer's problems and well functioned as usual lead to the delivering of good service to the clients.

Indicative content 3.5: Identification of common problems of projector

Duration: 1 hr

Theoretical Activity 3.5.1 Description of hardware issues of projector

Tasks:

1: You are asked to answer the following questions related to the Description of common hardware problems of projector

I. What is a projector?
II. Explain the types of projector
III. Describe the hardware issues of the projector

2: Provide the answer for the asked questions as their findings
3: Present the findings/answers to the whole class
4: Ask the questions where are necessary and make clarification if any.
5: For more clarification, Read the key readings 3.5.1

Key readings 3.5.1: Description of hardware issues of projector

- **A projector** is a device that takes images or video from a computer or other input source and projects them onto a larger surface, such as a screen or wall.
- **Some types of projector**
  - ✓ Interactive Projectors: Equipped with sensors that allow users to interact directly with the projected image, often paired with styluses or touch technology.
  - ✓ Portable Projectors: It is a compact, lightweight, and often battery-powered device designed to project images, videos, or presentations onto a screen or flat surface, making it easy to carry and set up anywhere.
  - ✓ Education Projectors or Pico Projectors: It is Small, portable projectors that often use LED light sources and DLP or LCoS technology.
  - ✓ DLP (Digital Light Processing) Projectors: Use a digital micromirror device (DMD) chip and a spinning color wheel to project images. Light is reflected off tiny mirrors on the DMD chip.
  - ✓ LCD (Liquid Crystal Display) Projectors: Use liquid crystal panels to display images by passing light through red, green, and blue LCD panels.
  - ✓ Short Throw and Ultra-Short Throw Projectors: Designed to project large images from a short distance using specially designed lenses.
  - ✓ 4K and 8K Projectors: High-resolution projectors capable of displaying ultra-high-definition (UHD) images with 4K or 8K resolution.

- **Hardware issues**
  - ✓ The projector shuts down unexpectedly or displays warning lights indicating overheating.
  - ✓ Dim or flickering images, or the projector fails to power on may indicate the projector's lamp is nearing the end of its lifespan or has burnt out.
  - ✓ Blurry, distorted, or unfocused images may indicate misalignment of the lens
  - ✓ Unusually loud noise coming from the projector during operation may indicate malfunctioning or clogged cooling fan
  - ✓ The projector does not display an image, or the image is intermittent may indicate Connectivity Issues
  - ✓ The projector does not respond to remote control commands may indicate a malfunctioning remote control.
  - ✓ Overheating: Projectors can overheat if they are used for extended periods without proper ventilation. Overheating can lead to automatic shutdowns, reduced image quality, or damage to internal components.
  - ✓ Lamp Burnout: The projector lamp has a limited lifespan and can burn out after extensive use. When the lamp is nearing the end of its life, the image may become dim, or the projector may not turn on at all.
  - ✓ Dust and Debris Accumulation: Dust and debris can accumulate inside the projector, affecting the lens, fans, and internal components. This can cause poor image quality, overheating, or noisy operation.
  - ✓ Lens Problems: The projector's lens can become dirty, scratched, or misaligned, leading to blurry or distorted images. In some cases, the lens may not focus correctly, resulting in an unclear picture.
  - ✓ Color Wheel Issues (in DLP Projectors): DLP projectors use a color wheel to produce color images. If the color wheel becomes misaligned, damaged, or stops spinning, the projector may display incorrect colors or a distorted image.
  - ✓ Power Supply Problems: A faulty power supply can prevent the projector from turning on or cause it to shut down unexpectedly. This issue may be due to a damaged power cord, loose connections, or an internal power supply failure

Theoretical Activity 3.5.2 Description of common software problems of projector

Tasks:

1: You are asked to answer the following questions related to the Description of common software problems of projector

I. Describe the common software issues of the projector

2: Provide the answer for the asked questions as their findings

3: Present the findings/answers to the whole class

4: Ask the questions where are necessary and make clarification if any.

5: For more clarification, Read the key readings 3.5.2

Key readings 3.5.2: Description of common software problems of projector

- **Software issues:**
  - ✓ The projector suddenly starts having issues after a power outage, update, or without any obvious hardware problem, the firmware might be corrupted or outdated
  - ✓ The projector fails to display content from a connected device may indicate the issue may be with the drivers on the computer or the projector itself
  - ✓ The projector is on, but no image is displayed, or it displays a "No Signal" message may indicate the input source is incorrectly configured, or the source device is not properly selected on the projector.
  - ✓ The projector works with some devices but not with others, or specific applications do not display correctly may indicate Compatibility issues with newer operating systems or devices
  - ✓ Firmware Bugs: Projectors, like many electronic devices, run on firmware. If the firmware is outdated or has bugs, it can cause various issues, such as crashes, malfunctioning features, or inconsistent performance.
  - ✓ Compatibility Issues: Sometimes, a projector may not be fully compatible with certain input devices or software, leading to issues like no signal detection, incorrect resolutions, or poor color rendering.
  - ✓ Signal Processing Errors: Projectors process video signals from various sources. Errors in this process can result in distorted images, incorrect aspect ratios, or color inaccuracies.
  - ✓ Software Glitches: Temporary glitches can occur in the projector's software, leading to problems such as frozen screens, unresponsive menus, or erratic behavior.
  - ✓ Configuration Issues: Incorrect software configurations, such as keystone correction, image scaling, or color calibration, can result in poor image quality or improper display.
  - ✓ Network Connectivity Problems: For projectors with network capabilities, issues such as difficulty connecting to Wi-Fi, dropped connections, or inability to stream content can occur due to software issues.

Points to Remember

- **A projector** is a device that takes images or video from a computer or other input source and projects them onto a larger surface, such as a screen or wall.
- **Some types of projector are**: Interactive Projectors, Portable Projectors, Education Projectors or Pico Projectors, 4K and 8K Projectors, Short Throw Projectors
- **Hardware issues**
  - ✓ The projector shuts down unexpectedly or displays warning lights indicating overheating.
  - ✓ Dim or flickering images, or the projector fails to power on may indicate the projector's lamp is nearing the end of its lifespan or has burnt out.
  - ✓ Blurry, distorted, or unfocused images may indicate misalignment of the lens
  - ✓ Unusually loud noise coming from the projector during operation may indicate malfunctioning or clogged cooling fan
  - ✓ The projector does not display an image, or the image is intermittent may indicate Connectivity Issues
  - ✓ The projector does not respond to remote control commands may indicate a malfunctioning remote control.
- **Software issues**
  - ✓ The projector suddenly starts having issues after a power outage, update, or without any obvious hardware problem, the firmware might be corrupted or outdated
  - ✓ The projector fails to display content from a connected device may indicate the issue may be with the drivers on the computer or the projector itself
  - ✓ The projector is on, but no image is displayed, or it displays a "No Signal" message may indicate the input source is incorrectly configured, or the source device is not properly selected on the projector.
  - ✓ The projector works with some devices but not with others, or specific applications do not display correctly may indicate Compatibility issues with newer operating systems or devices

Application of learning 3.5

BAMBO Company relies on projectors for meetings, presentations, and training sessions. Recently, the projector in the main conference room has been experiencing software issues that are affecting its performance, causing delays and frustration during important presentations. As computer system assembly technician, you are asked to identify the common problems of projector.

Indicative content 3.6: Implementation of solutions for common projector problems

Duration: 2 hrs

Practical Activity 3.6.1: Application of solution for hardware issues of projector

Task:

1: With referring to key readings 3.6.1, you are asked to perform the following task:
As a computer system assembly technician, you are asked to go to the workshop to Apply solutions for Hardware issues of your school's projector and make sure that the projector is working properly.
2: Apply solutions for Hardware issues of the projector
3: Present your work to the trainer/workshop instructor/classmate
4: Ask for clarification if any.

Key readings 3.6.1: Application of solution for hardware issues of projector

- Overheating:
  Ensure the projector is placed in a well-ventilated area, clean the air filters regularly, and avoid blocking the vents. Allow the projector to cool down before turning it back on after extended use.
- Lamp Burnout:
  Monitor the lamp hours and replace the lamp when it reaches the end of its lifespan. Always use a compatible replacement lamp recommended by the manufacturer.
- Dust and Debris Accumulation:
  Regularly clean the projector's exterior, air filters, and lens. Use compressed air to remove dust from internal components and consider professional cleaning if the projector is heavily used.
- Lens Problems: Clean the lens with a microfiber cloth and appropriate cleaning solution. If the lens is scratched or damaged, it may need to be replaced or professionally repaired
- Color Wheel Issues (in DLP Projectors):
  If color issues are noticed, the color wheel may need to be cleaned, realigned, or replaced by a professional technician.
- Power Supply Problems**:**

Check the power cord and connections for any damage or looseness. If the issue persists, the internal power supply may need to be inspected and repaired or replaced by a technician.

- Clean the vents and air filters regularly, ensure proper ventilation, and check if the cooling fan is working properly
- Replace the lamp with a new one, ensuring it is compatible with the projector mode
- Clean the lens carefully with a soft, lint-free cloth, and check for alignment issues. Replace the lens if it is scratched or damaged
- Clean the fan and its surroundings, and if the noise persists, replace the faulty fan
- Test with different cables, check the input ports for damage, and ensure the correct input source is selected.
- Check the remote control for damage.
  Replace the remote if necessary

Practical Activity 3.6.2: Application of solution for software issues of projector

Task:

1: You are asked to perform the following task:
As a computer system assembly technician, you are asked to go to the workshop to Apply solutions for software issues of your school's projector and make sure that the projector is working properly
2: identification of software issues of the projector
3: Apply solutions for software issues of the projector
4: Ask the questions where are necessary and make clarification if any.
5: For more clarification, Read the key readings 3.6.2

Key readings 3.6.2: Application of solution for software issues of projector

- Check the projector manufacturer's website for firmware updates.
  If available, download and install the latest firmware. In cases of corruption, a factory reset or firmware reinstallation may be necessary
- Ensure that the latest drivers for the projector and the connected device are installed.

- Check the projector's input settings to ensure the correct source is selected (e.g., HDMI, VGA).
  Also, verify the settings on the source device (computer, DVD player, etc.) to make sure it is outputting to the projector
- Ensure that the projector's software is compatible with the connected device's operating system
- Firmware Bugs:
  Regularly check for firmware updates from the manufacturer and apply them to fix known bugs and improve performance.
- Compatibility Issues:
  Ensure that the projector is compatible with the devices and software it is being used with. Update both the projector firmware and the connected device's software to the latest versions.
- Signal Processing Errors:
  Adjust the settings on both the projector and the input device to match the signal format. If the issue persists, reset the projector to factory settings or update its firmware.
- Software Glitches:
  Power cycle the projector (turn it off and on again) to resolve temporary glitches. If glitches continue, consider performing a factory reset.
- Configuration Issues:
  Reconfigure the projector settings to correct image issues. Use built-in calibration tools to adjust color settings and ensure proper alignment and scaling.
- Network Connectivity Problems:
  Ensure that the projector's network settings are correctly configured. Update the network drivers or firmware if necessary, and check for strong and stable Wi-Fi signals**.**

Points to Remember

- **Identify the Issue Clearly:** Before taking any action, make sure to accurately diagnose the hardware problem, such as lamp failure, overheating, or connectivity issues.
- **Safety First:** Always power off the projector and disconnect it from the power source before attempting any hardware repairs or maintenance to avoid electric shock or damage.
- **Use the Correct Tools:** Ensure that you use appropriate tools for disassembly and repair to prevent damage to the projector's components.
- **Handle with Care:** Projectors contain delicate parts, such as the lens, mirrors, and circuit boards. Handle these components with care to avoid further damage.

- **Monitor Lamp Usage:** Keep track of the lamp's usage hours. Replace it when nearing the end of its rated life to maintain image quality and avoid unexpected failures.
- **Verify Software Compatibility:** Ensure that the projector's software is compatible with the connected devices and the content being displayed. Incompatibilities can lead to display issues or functionality problems.
- **Keep Firmware Updated:** Regularly check for and install firmware updates provided by the manufacturer to fix bugs, enhance features, and improve overall performance.
- **Back Up Settings:** Before making significant software changes, such as updates or resets, back up the projector's configuration settings to avoid losing important customizations.
- **Reset to Factory Settings if Needed:** If the projector experiences persistent software issues, consider performing a factory reset to restore the original settings and resolve glitches.
- **Troubleshoot Error Messages**: Pay close attention to any error messages or codes displayed by the projector. Refer to the user manual or support resources to accurately diagnose and address the issue.

Application of learning 3.6

CUTE VISUAL HOUSE Company delivers movie shows (cinema theatre) service using projectors, their projector meet with the cases of Overheating, Dim Image, no Signal on connected computer, and the issues range from connection failures, incompatible display settings, to projector software errors. As a computer system and architecture technician, you are hired to fix those projector problems and this company continues to deliver cute services on their clients.

Indicative content 3.7: Identification of Common problems of scanner

Duration: 1 hr

Theoretical Activity 3.7.1 Description of common hardware problems of scanner

Tasks:

1: You are asked to answer the following questions related to the Description of common hardware problems of scanner.

I. What is a scanner
II. Explain the types of scanner
III. Describe the common hardware problem of the scanner

2: Provide the answer for the asked questions as their findings

3: Present the findings/answers to the whole class

4: Ask the questions where are necessary and make clarification if any.

5: For more clarification, Read the key readings 3.7.1

Key readings 3.7.1: Description of common hardware problems of scanner

- A **scanner** is a computer peripheral device that captures images, text, or other content from physical documents or objects and converts them into digital format.
- **Types of scanner**
  - ✓ **Flatbed Scanners:**
    The most common type of scanner, featuring a flat glass surface where documents or photos are placed for scanning. A moving scan head captures the image as it moves across the item and Generally scanning the documents, photos, books, and magazines. Suitable for home and office use.
  - ✓ **Sheet-Fed Scanners:**
    Documents are fed into the scanner via a tray, similar to a printer. The scan head remains stationary while the document moves through it and it used in Office environments where multiple pages need to be scanned quickly, such as invoices, forms, and letters.
  - ✓ **Handheld Scanners:**
    Portable scanners that are manually dragged across the item to be scanned, Typically battery-operated and compact, Scanning small sections of documents, books, receipts, and on-the-go scanning needs.
  - ✓ **Photo Scanners:**

Specialized flatbed scanners designed specifically for high-resolution photo scanning. Often include features like color correction and dust removal.

- ✓ **Film/Slide Scanners:**
  Designed to scan photographic films, negatives, and 35mm slides directly. Often used by photographers and archivists.
- ✓ **Book Scanners:**
  Specialized scanners with an overhead camera designed to scan bound books without damaging them. Pages are laid open, and the scanner captures images from above

- **Hardware issues**
  - ✓ The scanner does not power on, or it powers off unexpectedly during use may indicate Faulty power supply or power cable
  - ✓ The scanner's automatic document feeder (ADF) or flatbed jams during scanning, causing paper jam
  - ✓ The scanner is connected to the computer, but it is not recognized, may indicate Internal hardware failure in the scanner's interface board.
  - ✓ Scanned images are blurry, have lines or streaks, or show other defects may indicate scratched scanner glass or Malfunctioning scan head or optical sensors.
  - ✓ The scanner produces images with inaccurate colours, distorted shapes, or uneven brightness may indicate faulty calibration sensors.
  - ✓ Power Issues: The scanner does not power on or frequently shuts down and Faulty power cable, defective power supply, or internal power component failure.
  - ✓ Connectivity Problems: The scanner is not recognized by the computer or fails to communicate properly and it caused by damaged USB or interface cables, faulty ports, or internal connectivity issues.
  - ✓ Mechanical Failures: Grinding noises or the scanning head does not move smoothly and cause by Worn-out gears, belts, motors, or obstructions in the scanner
  - ✓ Optical Component Issues: Scans are blurry, streaky, or have poor image quality and Caused by dirty or misaligned mirrors, lenses, or scanning glass; faulty light source.
  - ✓ Paper Jams: Paper gets stuck or crumpled during scanning and caused by dirty or worn rollers, improper paper alignment, debris in the scanner.
  - ✓ Overheating: The scanner becomes unusually hot or shuts down due to overheating and caused by Blocked ventilation, excessive dust buildup, or malfunctioning cooling components.

Theoretical Activity 3.7.2 : Description of common software problems of scanner

Tasks:

1: You are asked to answer the following questions related to the Description of common problems of scanner

I. Describe the common software problem of the scanner

2: Provide the answer for the asked questions as their findings

3: Present the findings/answers to the whole class

4: Ask the questions where are necessary and make clarification if any.

5: For more clarification, Read the key readings 3.7.2

Key readings 3.7.2: Description of common software problems of scanner

- **Driver Issues:**

  Scanner drivers are essential for the communication between the scanner and the computer. If the drivers are outdated or corrupted, the scanner may not function correctly, or it may not be recognized by the operating system at all.

- **Software Compatibility Problems:**

  Compatibility issues arise when the scanner software is not updated to work with newer versions of the operating system or other software applications. This can lead to crashes, errors, or the inability to access certain features.

- **Scanner Not Detected:**

  Sometimes, even if the hardware is functioning correctly, the scanner may not be detected due to software issues. This can happen if the software settings are incorrect or if there is a problem with the connection.

- **Scanning Application Errors:**

  Scanning applications can sometimes crash or freeze due to bugs in the software, insufficient memory, or conflicts with other running programs. This can interrupt scanning operations and result in lost data.

- **Poor Scan Quality Settings:**

The quality of scanned images can be affected by the software settings. If the resolution is set too low, the scanned image will be pixelated. Incorrect color settings can lead to color distortion or grayscale scans instead of color.

- **Communication Errors:**

  For network scanners, communication errors can occur due to network issues or incorrect IP settings. Firewalls or security software might also block communication between the scanner and the computer.

- **Software Installation Issues:**

  Installation issues can prevent the scanner software from being properly installed or updated, leading to malfunction or the inability to use the scanner.

  - ✓ The scanner fails to work after being connected to a new computer, the issue might be with the drivers.
  - ✓ Software crashes may occur due to bugs in the scanning software, conflicts with other applications, or issues with the operating system
  - ✓ Scanned images are blurry, have incorrect colors, or are distorted. This could be due to incorrect software settings.
  - ✓ The scanner does not connect to the network, or network scanning features do not work, issues can arise from incorrect network settings
  - ✓ The scanner takes longer than usual to complete scans. Slow scanning caused by software settings, such as high resolution

Points to Remember

- Power and Connectivity Issues: Always check power cables, connections, and ports first when a scanner fails to power on or is not recognized by the computer and Replacing faulty cables or testing the scanner with a different power outlet can often resolve basic power issues.
- Mechanical Problems: Unusual noises or difficulties in the scanner head's movement usually point to mechanical issues like worn-out gears, belts, or motor failures and Regular cleaning and lubrication of moving parts can prevent many mechanical failures.

- Optical Component Concerns: Blurry or streaky scans often indicate dirty or misaligned mirrors, lenses, or scanning glass and Regularly clean optical components and ensure that they are properly aligned to maintain scan quality.
- Paper Jams: Paper jams are commonly caused by dirty rollers or improper paper alignment. Cleaning the rollers and ensuring proper paper loading can reduce the frequency of jams and Replace worn-out rollers to maintain smooth paper feeding.
- Overheating: Ensure that the scanner has adequate ventilation and is free from dust to prevent overheating and Inspect and, if necessary, replace malfunctioning cooling components
- Keep Drivers Updated: Ensure that the scanner drivers are always up to date to avoid compatibility issues and ensure smooth operation.
- Check Software Compatibility: Verify that the scanner software is compatible with your operating system. Incompatibility can lead to software crashes or malfunctions.
- Resolve Detection Problems: If the scanner is not detected, check USB connections, power supply, and software settings. Restarting the computer and scanner can often resolve detection issues.
- Manage Application Stability: Keep scanning software updated to the latest version to prevent crashes and freezes. Ensure that the computer has sufficient memory and close unnecessary programs before scanning.
- Optimize Scan Quality Settings: Adjust software settings such as resolution and color mode to achieve the desired scan quality. Test scan settings before performing important scans.
- Address Communication Errors: For network scanners, check network connections and IP settings. Ensure that firewalls or security software do not block communication with the scanner.
- Handle Installation and Update Issues: Ensure you have administrative rights for software installation. Disable conflicting software during installation to avoid problems

Application of learning 3.7

As computer system assembly technician, SANTOS Group that uses a Canon DR-C225 scanner to digitize legal documents hires you. Recently, employees have reported software-related problems that hinder their daily scanning tasks and scanned images are blurry, the scanner does not connect to the network. You are asked to identify the common problem affecting the scanner's performance and provide solutions to ensure smooth operation.

Indicative content 3.8: Implementation of solutions for common scanner problems

Duration: 2 hrs

Practical Activity 3.8.1: Application of solution for hardware issues of scanner

Task:

1: With referring to key readings 3.8.1, you are asked to perform the following task:
As a computer system assembly technician, you are asked to apply solutions for Hardware issues on your school's scanner not functioning correctly the school scanning activities as usual and make sure is well scanning lead to the good quality of services school delivering.
2: Apply solutions for Hardware issues of the scanner
3: Present your work to the trainer/workshop instructor/classmate
4: Ask for clarification if any.

Key readings 3.8.1: Application of solution for hardware issues of scanner

- **Power Issues**
  - ✓ Check Power Connections:
    Ensure that the power cable is securely connected to both the scanner and the power outlet.
  - ✓ Test the Power Outlet:
    Plug the scanner into a different power outlet to rule out issues with the outlet itself.
  - ✓ Replace Power Cable:
    If the cable is damaged, replace it with a new one.
  - ✓ Inspect Internal Power Components:
    If the scanner still doesn't power on, the internal power supply may need to be replaced by a technician.
- **Connectivity Problems**
  - ✓ Check Connections:
    Ensure that the USB or other interface cables are securely connected to both the scanner and the computer.
  - ✓ Replace Cables:
    Try using a different cable to rule out cable damage.
  - ✓ Test Different Ports:
    Connect the scanner to another USB port on the computer.
  - ✓ Update Drivers:

Ensure that the scanner drivers are up to date. If not, download and install the latest drivers from the manufacturer's website.

- ✓ Inspect Internal Connections:
  If the problem persists, there may be an internal hardware issue that requires inspection and repair.

- **Mechanical Failures**
  - ✓ Inspect for Obstructions:
    Open the scanner and check for any foreign objects or debris that might be obstructing the scanning head.
  - ✓ Clean the Scanner:
    Clean internal components like gears and belts to ensure smooth operation.
  - ✓ Replace Worn Components:
    If gears or belts are worn out, they need to be replaced.
  - ✓ Lubricate Moving Parts:
    Apply a small amount of appropriate lubricant to the moving parts if recommended by the manufacturer.
- **Optical Component Issues**
  - ✓ Clean the Glass and Mirrors:
    Use a lint-free cloth and appropriate cleaning solution to gently clean the scanning glass and mirrors.
  - ✓ Check Alignment:
    Ensure that the mirrors and lenses are correctly aligned.
  - ✓ Replace Light Source:
    If the light source (LEDs or lamps) is dim or flickering, it may need to be replaced.
  - ✓ Calibration:
    Run a calibration process if the scanner supports it to improve image quality.
- **Paper Jams**
  - ✓ Remove Jammed Paper:
    Carefully remove any jammed paper from the scanner.
  - ✓ Clean Rollers:
    Clean the paper rollers with a damp cloth to remove dust and debris.
  - ✓ Align Paper Properly:
    Ensure that the paper is properly aligned in the feeder before scanning.
  - ✓ Replace Rollers:
    If the rollers are worn out, they should be replaced.
- **Overheating**
  - ✓ Check Ventilation:

Ensure that the scanner's ventilation is not blocked and that it is placed in a well-ventilated area.

- ✓ Clean Internal Components:
  Open the scanner and remove dust buildup from internal components using compressed air.
- ✓ Inspect Cooling Fans:
  Check that any internal cooling fans are functioning properly. If not, they may need to be replaced

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Practical Activity 3.8.2: Application of solution of software issues of scanner

Task:

1: With referring to key readings 3.8.2, you are asked to perform the following task:
As a computer system assembly technician, you are asked to apply solutions for software issues on your school's scanner not functioning correctly the school scanning activities as usual and make sure is well scanning lead to the good quality of services school delivering.
2: Apply solutions for software issues of the scanner
3: Present your work to the trainer/workshop instructor/classmate
4: Ask for clarification if any.

Key readings 3.8.2: Application of solution of software issues of scanner

- **Driver Issues:**
  Update the scanner drivers by downloading the latest version from the manufacturer's website. If drivers are missing or corrupted, reinstalling the correct drivers can resolve the issue.
- **Software Compatibility Problems:**
  Ensure that the scanner software is compatible with your operating system. Updating or upgrading the software to the latest version can resolve compatibility issues.
- **Scanner Not Detected:**
  Check the USB connection and ensure that the scanner is properly connected and powered on. Verify the software settings to ensure that the correct scanner is selected. Restarting the computer and scanner can also help in detecting the device.
- **Scanning Application Errors:**

Update the scanning application to the latest version to fix any bugs. Ensure that your computer has sufficient memory and close unnecessary applications before scanning. If the issue persists, reinstall the scanning software.

- **Poor Scan Quality Settings:**
  Adjust the software settings to the appropriate resolution, color mode, and file format for the desired scan quality. Perform a test scan to ensure that the settings are correct**.**
- **Communication Errors:**
  Check the network connection and ensure that the scanner is connected to the correct network. Verify the IP settings of the scanner. Adjust firewall settings to allow communication with the scanner.
- **Software Installation Issues:**
  Ensure that you have administrative rights to install the software. Disable any conflicting software during installation. If the installation fails, try using the manufacturer's recommended installation steps or software
- **Download the latest drivers** from the scanner manufacturer's website, If the drivers are already installed, try reinstalling or updating them.
- **Close any unnecessary applications** before scanning, and consider reinstalling the software
- **Adjust the scanning settings** in the software to match your needs
- **Verify the network settings** on both the scanner and the computer
- **Ensure** that the scanner is connected to the same network as the computer.
- **Lower the resolution or adjust other settings** that might be causing the slowdown.

Points to Remember

- Regular Inspection: Periodically inspect the scanner's hardware components, including the glass platen, rollers, and sensors, for dust, dirt, or physical damage.
- Use Proper Cleaning Techniques: Clean the scanner glass, rollers, and other components using appropriate cleaning materials (e.g., microfiber cloths, specialized cleaning solutions) to avoid scratching or damaging the surfaces.
- Check Connections: Ensure all cables and connections, including USB and power cords, are securely connected. Loose or damaged cables can lead to connectivity and power issues.
- Avoid Overheating**:** Ensure the scanner is placed in a well-ventilated area to prevent overheating. Overheating can cause hardware components to fail or degrade over time.

- Handle with Care: Avoid applying excessive force when placing documents or operating the scanner. Gentle handling can prevent physical damage to sensitive parts like the scanning head or glass.
- Firmware Updates: Regularly update the scanner's firmware if available, as these updates can fix bugs and improve hardware performance.
- Ensure Driver Compatibility: Always use the correct and latest drivers for your scanner model. Compatibility between the driver and operating system is crucial to avoid functionality issues.
- Regular Software Updates: Keep the scanner's software and associated applications up to date to benefit from the latest features, security patches, and bug fixes.
- Verify Network Settings: For network-connected scanners, ensure that IP addresses and network configurations are correctly set to maintain stable connectivity.
- Test Scanning Software: After installation or updates, test the scanning software to ensure it functions correctly and meets your scanning needs.
- Check for Conflicting Software: Ensure that no other applications are interfering with the scanner software. Disable or uninstall conflicting programs if necessary.
- Optimize Software Settings: Configure the software settings (such as resolution, color depth, and file format) according to your specific requirements to achieve optimal scanning results**.**

Application of learning 3.8

SMOOTH Group, a growing accounting and auditing firm, relies heavily on scanners to digitize documents, receipts, and contracts for efficient record-keeping and client management. Recently, employees have been facing software-related issues with their main office scanners, causing delays in processing important paperwork and affecting workflow efficiency. The scanners frequently encounter software errors when employees attempt to scan documents to their computers. The errors range from software crashes, failed scans, to misconfigured output settings, resulting in lost productivity and frustrated staff. As computer system assembly technician, you are hired by SMOOTH Group to solve those scanner issues in order to continue the stacked workflow efficiency.

Indicative content 3.9: Application of preventive measures

Duration: 2 hrs

Theoretical Activity 3.9.1: Description of preventive measures

Tasks:

1: You are requested to answer the following questions for describing preventive measures of computer peripherals maintenance

I. Define the term preventive measures
II. What are the purpose of preventive measures
III. Explain the types of preventive measures

2: Listening attentively the introduction and instructions of the tasks given

3: Provide the answer of the asked questions and write them on papers

4: Present the findings to the whole class

5: Ask the questions where are necessary and make clarification if any.

6: For more clarification, read the key readings 3.9.1

Key readings 3.9.1: Description of preventive measures

- **Preventive measures** refer to proactive actions, practices, or strategies implemented to prevent potential problems or failures before they occur. In the context of computer peripherals maintenance, preventive measures involve regular maintenance, inspections, and updates aimed at reducing the risk of hardware or software issues, ensuring the longevity and reliability of devices.
- **The primary purposes of preventive measures in computer peripherals maintenance are:**
  - ✓ **Reduce the Likelihood of Failures:** Preventive measures are designed to identify and address potential issues before they lead to hardware or software failures, thereby reducing downtime and the need for repairs.
  - ✓ **Extend Device Lifespan:** By maintaining peripherals in good working condition through regular cleaning, updates, and proper usage, preventive measures help extend the lifespan of these devices.
  - ✓ **Ensure Consistent Performance:** Preventive maintenance ensures that peripherals operate efficiently and reliably, avoiding performance degradation over time.

- ✓ **Minimize Maintenance Costs:** Preventive measures can reduce the need for costly repairs or replacements by addressing minor issues before they escalate into major problems.
- ✓ **Enhance User Safety:** By maintaining peripherals properly, preventive measures also contribute to user safety, preventing accidents or injuries caused by malfunctioning equipment.
- ✓ **Improve Productivity:** Reliable and well-maintained peripherals contribute to smoother workflows and higher productivity, as users experience fewer interruptions and delays due to equipment issues.
- ✓ **Compliance with Standards:** Regular preventive maintenance helps ensure that peripherals comply with industry standards and regulations, which may be required for certain business operations or certifications

- **Types of Preventive Measures for Computer Peripherals**
  - ✓ Regular Cleaning and Dust Removal: Dust and debris can accumulate inside and on the surfaces of peripherals, leading to overheating, malfunctioning keys, or blocked sensors and use compressed air, soft brushes, and microfiber cloths to clean keyboards, mice, scanners, and printers. For internal cleaning, ensure power is off and use specialized cleaning tools to avoid damaging components.
  - ✓ Software and Firmware Updates: Outdated software and firmware can cause compatibility issues, bugs, and security vulnerabilities in peripherals, Regularly check for and install updates for drivers, firmware, and associated software for printers, scanners, and other devices. Enable automatic updates where possible.
  - ✓ Proper Storage and Handling: Physical damage can occur from improper handling, dropping, or storing peripherals in unsuitable conditions, Store peripherals in a clean, dry, and dust-free environment. Use protective covers for keyboards and screens, and avoid placing heavy objects on top of sensitive devices like printers and external drives.
  - ✓ Regular Calibration and Alignment: Devices like printers, scanners, and monitors require periodic calibration to maintain accuracy and quality, Perform regular calibration and alignment checks using built-in tools or software provided by the manufacturer, especially after significant use or environmental changes.
  - ✓ Cable Management and Inspection: Damaged or tangled cables can lead to connectivity issues, signal loss, or electrical hazards, Organize and secure cables using ties, clips, or cable management sleeves. Regularly inspect cables for wear, fraying, or damage, and replace them if necessary.
  - ✓ Power Protection: Power surges, outages, and fluctuations can damage sensitive peripherals like printers, monitors, and external drives. Use surge

protectors, Uninterruptible Power Supplies (UPS), and voltage regulators to safeguard peripherals against electrical disturbances.

- ✓ Routine Functionality Testing: Regular testing helps identify potential problems before they impact performance, Perform routine checks on peripherals, such as test prints on printers, scan tests on scanners, and response tests on keyboards and mice. Use diagnostic tools to assess the health of external drives and other devices.
- ✓ Environmental Control: Excessive heat, humidity, or exposure to direct sunlight can affect the performance and longevity of peripherals. Keep peripherals in climate-controlled environments, avoid direct sunlight, and maintain optimal temperature and humidity levels as recommended by the manufacturer.
- ✓ Avoiding Physical Strain and Overuse: Excessive use or improper operation can lead to premature wear and failure of peripherals. Use peripherals within their recommended operational limits. Avoid excessive force on keyboards, use wrist rests, and ensure mice and trackpads are used on appropriate surfaces.
- ✓ Secure Connections and Ports: Loose or damaged connections can cause intermittent performance issues and data loss. Regularly check and secure connections for peripherals, ensuring that USB, HDMI, and other cables are firmly inserted. Avoid frequent plugging and unplugging of devices, which can wear out ports.
- ✓ Backup and Data Protection: Data loss can occur due to peripheral failure, particularly with storage devices like external hard drives and USB flash drives. Regularly back up data stored on peripheral devices to avoid loss in case of malfunction. Use software tools to check the health of storage peripherals and manage data proactively.

Practical Activity 3.9.2: Application of preventive measures

Tasks:

1: With referring to key readings 3.9.2, you are asked to perform the following task:

As a computer system assembly technician, you are asked to apply the types of preventive measures on your school's computer lab computer peripherals in order to maintain the functionality, safety, and efficiency of systems, equipment or processes

2: Apply preventive measures on computer peripherals

3: Present your work to the trainer/workshop instructor/classmate

4: Ask for clarification if any.

Key readings 3.9.2: Application of preventive measures

- **Understanding Preventive Maintenance**
  - ✓ Overview of preventive maintenance
  - ✓ Benefits and objectives of preventive measures
  - ✓ How preventive maintenance differs from corrective maintenance
- **Types of Preventive Maintenance Measures**
  - ✓ Time-based preventive measures (regular cleaning schedules)
  - ✓ Condition-based preventive measures (inspecting components based on wear and tear)
  - ✓ Predictive maintenance techniques (using diagnostic tools to predict failures)
- **Practical Application of Preventive Maintenance**
  - ✓ Step-by-step procedures for performing preventive maintenance on specific peripherals (printers, scanners)
  - ✓ Tools and equipment needed for preventive maintenance
  - ✓ How to schedule and document preventive maintenance activities
    - **Software Tools for Preventive Maintenance**
  - ✓ Overview of CMMS software and its role in preventive maintenance
  - ✓ How to track and manage preventive maintenance tasks using software tools
  - ✓ Data analysis and reporting for preventive maintenance
    - **Case Studies and Real-World Examples**
  - ✓ Case studies demonstrating the application of preventive measures in different settings
  - ✓ Lessons learned and best practices from successful preventive maintenance programs
  - ✓ Common challenges and how to overcome them

Points to Remember

Explanation of preventive measures

- ✓ **Preventive measures** are proactive actions, strategies, or practices implemented to anticipate and mitigate potential issues, problems, or failures before they occur.
- ✓ **The purpose of preventive measures** is to maintain the functionality, safety, and efficiency of systems, equipment, or processes
- ✓ **Types of preventive measures:** Regular Cleaning and Dust Removal, Software and Firmware Updates, Proper Storage and Handling, Regular Calibration and Alignment, Cable Management and Inspection, Power Protection.

Application of preventive measures

- Regularly apply preventive measures according to a well-defined schedule or routine.
- Consistency ensures that potential issues are identified and addressed before they lead to significant problems.
- Establish maintenance schedules for cleaning, updates, inspections, and other preventive tasks.
- Regular Cleaning and Maintenance: Routine cleaning and servicing of equipment to prevent issues like dust build up, wear, and malfunction.
- Software Updates and Patching: Keeping software, firmware, and operating systems up to date to protect against vulnerabilities and ensure compatibility**.**
- Inspections and Testing: Regularly inspecting and testing equipment to identify potential problems before they cause failure
- Backup and Redundancy: Creating backups and having redundant systems to ensure data and operational continuity
- Environmental Controls: Maintaining the physical environment to prevent damage from factors like heat, humidity, and dust

Application of learning 3.9

SATA Group relies heavily on computers and printers for daily operations. Recently, there have been reports of slow computers, paper jams, and poor print quality. The company decides to implement a preventive maintenance plan to address these issues, as computer system assembly technician, you are asked to apply preventive measures on their computer peripherals.

Indicative content 3.10:Perform preventive peripheral maintenance

Duration: 2 hrs

Practical Activity 3.10.1: Application of preventive peripheral maintenance

Task:

1: With referring to key readings 3.10.1, you are asked to perform the following task:

XYZ TSS has equipped their computer lab with different computer peripherals. This school need to make a preventive measure maintenance in order to prevent their computer lab against malfunctioning. As computer system assembly technician, you are hired to perform preventive peripheral maintenance on their computer peripherals.

2: Apply the preventive peripheral maintenance
3: Present your work to the trainer/workshop instructor/classmate
4: Ask for clarification if any.

Key readings 3.10.1: Application of preventive measures

- **General Preventive Maintenance Principles**
  - ✓ Importance of regular maintenance schedules
  - ✓ How preventive maintenance differs from reactive maintenance
- **Peripheral-Specific Preventive Maintenance**
  - ✓ Specific maintenance tasks for printers, scanners, and other peripherals
  - ✓ Cleaning procedures for different peripherals
  - ✓ How to prevent common peripheral issues (e.g., paper jams, scanner calibration errors)
- **Tools and Equipment for Preventive Maintenance**
  - ✓ Essential tools and materials for cleaning and maintaining peripherals
  - ✓ Software tools for tracking and managing maintenance schedules
  - ✓ How to choose the right tools for specific maintenance tasks
- **Creating and Managing Maintenance Schedules**
  - ✓ Developing and managing preventive maintenance schedules
  - ✓ Prioritizing maintenance tasks based on equipment usage and criticality
  - ✓ How to adjust schedules based on the condition and performance of peripherals
- **Case Studies and Practical Applications**

- ✓ Real-world applications of preventive maintenance for peripherals
- ✓ Lessons learned from successful maintenance programs
- ✓ Common challenges and solutions in preventive maintenance

Points to Remember

- **Regular Scheduling:** Establish a consistent maintenance schedule for all peripherals. Regular checks and cleaning are crucial to prevent the accumulation of dust, debris, and wear that could lead to hardware failures.
- **Device-Specific Care:** Tailor preventive maintenance procedures to the specific needs of each peripheral. For example, printers may require regular cleaning of print heads and rollers, while scanners might need calibration and software updates.
- **Use the Right Tools:** Always use the appropriate tools and materials for the maintenance task. Using the wrong tools can cause damage to the equipment.
- **Keep Documentation:** Record all maintenance activities, including dates, tasks performed, and any issues detected. This documentation helps track the history of the equipment and identify patterns that may indicate potential problems.
- **Update Firmware and Drivers:** Ensure that all firmware and drivers are up-to-date. Outdated software can lead to compatibility issues and suboptimal performance.
- **Inspect Cables and Connections:** Regularly check all cables, connections, and ports for wear and tear. Loose or damaged cables can cause intermittent connectivity issues.
- **Clean and Dust-Free Environment:** Maintain a clean environment around your peripherals. Dust and dirt can infiltrate devices and cause overheating or mechanical failures.
- **Monitor Usage and Wear:** Pay attention to how frequently peripherals are used and any signs of wear. High-usage devices may require more frequent maintenance.
- **Proactive Replacement:** Replace consumable parts, such as printer toner or scanner lamps, before they are completely depleted to avoid downtime.
- **Safety First:** Always turn off and unplug devices before performing maintenance. This ensures safety and prevents damage to the equipment.

Application of learning 3.10

ABC INCHES STUDIO is small business relies on several peripherals including printer, scanner, keyboard, mouse, and monitor .To prevent downtime and ensure smooth functionality, the office manager schedules a quarterly preventive maintenance day.as a computer system and architecture you are asked to perform preventive maintenance on such peripherals printer, scanner ,keyboard, mouse, and monitor

Indicative content 3.11: Perform corrective maintenance

Duration: 3 hrs

Practical Activity 3.11.1 Perform corrective hardware maintenance of computer peripheral

Task:

1: With referring to key readings 3.11.1, you are asked to perform the following task:

As a computer system assembly technician, you are asked to perform corrective hardware maintenance of your computer peripherals in the equipped computer lab of your school.

2: Perform corrective hardware maintenance of computer peripheral

3: Present your work to the trainer/workshop instructor/classmate

4: Ask for clarification if any.

Key readings 3.11.1: Perform corrective hardware maintenance of computer peripheral

- **Overview of software maintenance**
  - ✓ Overview of software maintenance and its role in the software lifecycle
  - ✓ Different types of software maintenance: corrective, adaptive, perfective, and preventive
  - ✓ The importance of corrective maintenance in ensuring software reliability
- **Troubleshooting and Debugging Techniques**
  - ✓ Systematic approaches to identifying and diagnosing software bugs
  - ✓ Common tools and techniques for software debugging
  - ✓ How to efficiently track down the root cause of software problems
- **Tools and Techniques for Corrective Maintenance**
  - ✓ Tools used for debugging, such as debuggers, profilers, and log analyzers
  - ✓ The role of version control in managing changes and fixes in software
  - ✓ Best practices for applying patches and updates to software systems
- **Software Maintenance Case Studies**
  - ✓ Real-world examples of software bugs and how they were resolved
  - ✓ The process of refactoring code as part of corrective maintenance
  - ✓ Lessons learned from significant software failures and their fixed

Practical Activity 3.11.2 Perform corrective software maintenance of computer peripherals

Task:

1: With referring to key readings 3.11.2, you are asked to perform the following task:

SMART Remote Company's computer lab has encountered a recurring issue with one of its networked printers. The printer fails to process print jobs, and users frequently encounter a "Driver Not Found" error. As the hired computer system assembly technician, your responsibility is to resolve this problem across all lab computers. Additionally, you will verify the functionality of other computer peripherals to prevent similar software-related issues from disrupting operations in the lab.

2: Perform corrective software maintenance of computer peripheral

3: Present your work to the trainer/workshop instructor/classmate

4: Ask for clarification if any.

Key readings 3.11.2: Perform corrective software maintenance of computer peripherals

- **Overview of computer hardware**
  - ✓ Overview of computer hardware components and their functions
  - ✓ The role of corrective maintenance in hardware lifecycle management
  - ✓ Basic troubleshooting and repair techniques for common hardware problems
- **Troubleshooting Techniques for Hardware**
  - ✓ Systematic approaches to hardware troubleshooting
  - ✓ Common tools used for diagnosing hardware issues, such as multimeters, POST cards, and diagnostic software
  - ✓ How to identify symptoms of hardware failures and trace them to their root causes
- **Repair and Replacement Techniques**
  - ✓ Step-by-step procedures for repairing or replacing faulty hardware components
  - ✓ Techniques for handling delicate components to avoid further damage
  - ✓ Best practices for sourcing and installing replacement parts
- **Preventive Maintenance to Reduce Corrective Maintenance**
  - ✓ How preventive maintenance can help reduce the frequency and severity of corrective maintenance

- ✓ Routine checks and maintenance tasks that keep hardware in good working condition
- ✓ How to establish a preventive maintenance schedule

- **Documentation and Best Practices**
  - ✓ Importance of maintaining detailed records of all maintenance activities
  - ✓ How to document issues, corrective actions taken, and the results
  - ✓ Use of diagnostic flowcharts and checklists for efficient hardware troubleshooting

Points to Remember

Perform corrective hardware maintenance of computer peripheral

- **Repair hardware**
  - ✓ Identification of the Problem
  - ✓ Review the hardware's user manual or technical documentation to understand normal operation and troubleshooting steps
  - ✓ Ensure the device is powered off and unplugged before starting any repair work
  - ✓ Perform the Repair process
  - ✓ Verify Functionality
  - ✓ Cleaning all hardware parts
  - ✓ Repair the broken parts
  - ✓ Extend the hardware components
- **Replace hardware**
  - ✓ Identification of the hardware to be replaced by diagnose issue
  - ✓ Ensure that the new hardware component is compatible with the existing system.
  - ✓ Backup Data (if applicable)
  - ✓ Remove the Old Hardware
  - ✓ Insert the New Component
  - ✓ Verify the new hardware Functionality

Perform corrective software maintenance of computer peripherals

- **Systematic Diagnosis:** Always begin with a thorough diagnosis to accurately identify the root cause of the software issue. Use tools like debuggers, log analyzers, and error tracking systems to gather relevant information.
- **Prioritize Issues:** Not all issues are equally critical. Prioritize them based on their impact on the system or users, addressing the most critical problems first.

- **Version Control:** Ensure that you are using version control (e.g., Git) to track changes. This allows you to document what was fixed, why it was fixed, and provides the ability to roll back if necessary.
- **Testing:** After implementing a fix, thoroughly test the software to ensure the problem is resolved and that no new issues have been introduced. Automated tests can be particularly useful in ensuring consistency.
- **Documentation :** Document every step of the maintenance process, including the nature of the issue, how it was identified, the steps taken to resolve it, and any follow-up actions. This documentation can be invaluable for future maintenance tasks.
- **User Communication:** If the issue affects users, communicate clearly with them about what was fixed, how it impacts them, and if any action is required on their part.
- **Thorough Diagnosis:** Always start with a detailed diagnosis to accurately identify the hardware issue. Use diagnostic tools, error codes, and system logs to pinpoint the problem.
- **Safety First:** Before beginning any maintenance, ensure the equipment is powered off and disconnected from any power source. Use anti-static precautions to protect sensitive components from electrostatic discharge.
- **Documentation**: Keep detailed records of the issue, steps taken during diagnosis, and the corrective actions performed. This documentation is crucial for future reference and troubleshooting.
- **Tool Selection:** Use the appropriate tools for the job. Using the wrong tools can cause further damage to hardware components.
- **Replacement Parts:** Ensure that any replacement parts are compatible with the system and of high quality. Avoid using counterfeit or substandard components.
- **After Repair:** After completing the corrective maintenance, thoroughly test the hardware to ensure the issue is resolved and the system is functioning correctly. This may involve running diagnostic software or performing a functional check.
- **Preventive Measures:** Consider what preventive actions can be taken to avoid the issue in the future. Implementing preventive maintenance practices can reduce the likelihood of recurring problems.
- **User Communication:** If the hardware maintenance affects users, inform them of the issue, what was done to resolve it, and any steps they need to take (such as restarting the system or updating software).

Application of learning 3.11

WD Company is company that delivering of insurance. It relies on various computer peripherals, including printers, scanners, and external storage devices, to support daily operations. Recently, the company has been experiencing software-related issues with

several peripherals, causing disruptions in workflows and affecting productivity (Printers Not Responding, Scanner Software Crashes, External Hard Drives Not Recognized, Slow or Erratic Mouse and Keyboard Response) the suspected problems cause of that problems including: outdated drivers, software conflicts, and incorrect configurations, leading to frequent errors and performance issues. As computer system assembly technician you hired to perform corrective software maintenance to resolve these issues and restore normal operations.

Learning outcome 3 end assessment

Written assessment

I. Circle the letter corresponding to the correct answer

Q1. Which of the following is a common preventive maintenance task for a printer?

A) Updating the operating system

B) Cleaning the print heads

C) Defragmenting the hard drive

D) Installing antivirus software

Q2. What is the primary purpose of performing firmware updates on peripherals?

A) To increase internet speed

B) To protect against viruses

C) To improve functionality and fix bugs

D) To increase the computer's RAM

Q3. What tool is typically used to prevent static electricity damage when working with internal hardware components?

A) Multimeter

B) Anti-static wrist strap

C) Compressed air

D) Screwdriver

Q4. Which of the following is NOT a sign that a peripheral device may require corrective maintenance?

A) Device not recognized by the computer

B) Regular updates available from the manufacturer

C) Frequent paper jams in a printer

D) Poor print quality

Q5. What should you do first before replacing a faulty component in a peripheral device?

A) Purchase a new device

B) Disconnect the device from power

C) Remove all cables from the computer

D) Update the device drivers

Q6: What is the primary goal of computer peripherals maintenance?

a) To enhance the physical appearance of peripherals
b) To ensure that peripherals function properly and extend their lifespan
c) To increase the speed of the computer
d) To reduce electricity consumption

Q7: Which tool is most commonly used for disassembling a printer for maintenance?

a) Hammer
b) Precision screwdriver set
c) Pliers
d) Multimeter

Q8. What is a common cause of paper jams in printers?

a) Incorrect printer drivers
b) Misaligned or overloaded paper trays
c) Low ink levels
d) Outdated firmware

Q9. If a printer is not printing even though it is connected and has sufficient ink, what is the first step you should take?

a) Replace the printer
b) Restart the computer
c) Check the printer's queue and clear any stuck print jobs
d) Reinstall the operating system

Q10. What could be the cause if a projector displays a dim image? **(2Marks)**

a) Incorrect HDMI cable
b) Low projector lamp life
c) Incorrect input source
d) Damaged VGA port

Q11. How should you resolve a projector displaying a "No Signal" message despite being connected to a laptop? **(2Marks)**

a) Replace the projector lamp
b) Update the projector's firmware
c) Check the cable connections and ensure the correct input source is selected
d) Restart the projector multiple times

Q12. What is a typical reason for a scanner producing distorted or unclear images?

a) Scanner software corruption
b) Dirty scanner glass or rollers
c) Incompatible USB port
d) Outdated printer drivers

Q13. What is the best solution if a scanner is consistently producing streaks on scanned images?

a) Recalibrate the scanner
b) Clean the scanner glass and rollers
c) Update the scanner drivers
d) Replace the scanner bulb

Q14. Which of the following is an effective preventive measure for maintaining computer peripherals?

a) Using peripherals only once a month
b) Regular cleaning and dust removal
c) Overloading the device with multiple tasks
d) Skipping firmware updates

Q15. What is the first step in performing corrective maintenance on a malfunctioning keyboard?

a) Replace the entire keyboard
b) Update the keyboard drivers
c) Check the connection and test the keyboard on another device
d) Disassemble the keyboard

Q16. What should you do if your printer is printing faded or incomplete pages?

A) Replace the printer with a new one
B) Clean or replace the printer cartridges/toner

C) Reinstall the operating system

D) Increase the brightness settings on your computer

Q17. Which of the following is a common symptom of a faulty keyboard?

A) The mouse pointer freezes

B) No keys respond when pressed

C) The monitor screen flickers

D) The computer powers off randomly

Q18. What is the first action to take when a USB device is not being recognized by the computer?

A) Restart the computer

B) Check the USB cable or port for damage

C) Update the BIOS of the computer

D) Install a new operating system

Q19. What is the purpose of updating the drivers for a computer peripheral?

A) To improve the device's appearance

B) To ensure compatibility with the operating system and improve functionality

C) To change the physical connections of the device

D) To increase the computer's processing power

II. Answer the following question by True or False

a) Regular maintenance of computer peripherals is unnecessary as long as they are working properly.

b) A multimeter is often used to check the electrical connections of peripherals during maintenance.

c) A printer producing faded prints is most likely due to a software issue.

d) If a projector is not displaying any image, the first step is to check the power cable and the input source.

e) Keeping computer peripherals covered when not in use is an effective preventive measure against dust accumulation.

f) A hammer is an essential tool for performing maintenance on computer peripherals.

g) Replacing the projector's bulb is a common solution for resolving dim image output.

h) Skipping firmware updates for peripherals is a good preventive measure to ensure

i) Do printers require regular software updates to maintain optimal performance?

j) Can a wireless mouse stop working if its battery is low?

k) Should you always replace a non-functional printer immediately?

l) Does regularly cleaning a keyboard help prevent issues like sticky keys or unresponsiveness?

m) Can outdated drivers cause computer peripherals to malfunction?

n) Is it necessary to turn off the computer before connecting or disconnecting a USB peripheral?

III. Open Questions

Q1. What are the key objectives of computer peripherals maintenance?

Q2. Explain why it is important to select the appropriate tools and materials for computer peripherals maintenance.

Q3. How would you apply your knowledge of common printer problems to troubleshoot a printer that isn't printing?

Q5. List the common problems that can occur with scanners and their typical symptoms.

Practical assessment

ITUSHI CO. LTD is a firm that delivering all printing system in Rwanda. Their ICT Officer has reported a heavily relies on various computer peripherals, including multiple printers, projectors, and scanners, to support daily operations such as document preparation, presentations, and digital archiving. Recently, the firm has been experiencing a series of issues with these peripherals, disrupting workflow and causing delays in client services. As Computer System Assembly Technician You have been hired as to assess the situation, perform necessary maintenance, and implement a preventive maintenance plan to avoid future disruptions.

END

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